Industrial Finishing

Reg. U. S. Pat. Off.

An Independent Publication Devoted to the Finishing of Industrial Products

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LET FACTS AND FIGURES SHOW ADVANTAGES

From the Editor's Window

IDEAS for new products come more often from customers than from research laboratories, consequently it is to the interest of every manufacturer to maintain close contact and pleasant relationship with as many customers and prospective customers as possible. Industrial research laboratories are continually at work developing what buyers of factory products want, and it is a safe bet that the newest products announced in an industrial publication's advertising pages represent answers to the demands of a number of progressive buyers in that industry.

Take for example the advertising pages of INDUSTRIAL FINISHING magazine. Here you see presented the types of finishing materials, equipment, supplies, etc., that industrial management and finishers somewhere have been demanding, and which some firms are now using successfully. Reliable firms do not announce or offer products that are only in an experimental stage. All materials and equipment that a user of finishing materials is not acquainted with, but which he might possibly use—these he should investigate promptly. If he doesn't, he remains ignorant of something his more aggressive competitors have called for and are now using to profitable advantage.

It is only a matter of good business sense to take immediate steps to find out what the merits of new products are and how they are used, and then allow some time for thinking and speculating on how these products might be adapted to even greater advantage in one's own plant. Being too far behind in the procession of progress is costing many firms their existence, and more individuals their valuable positions.

W. H. Rohr

Managing Editor

They all claimed that any lacquer put on cold rolled steel strip would brittle up in two months' time.

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2. Perfect Adhesion

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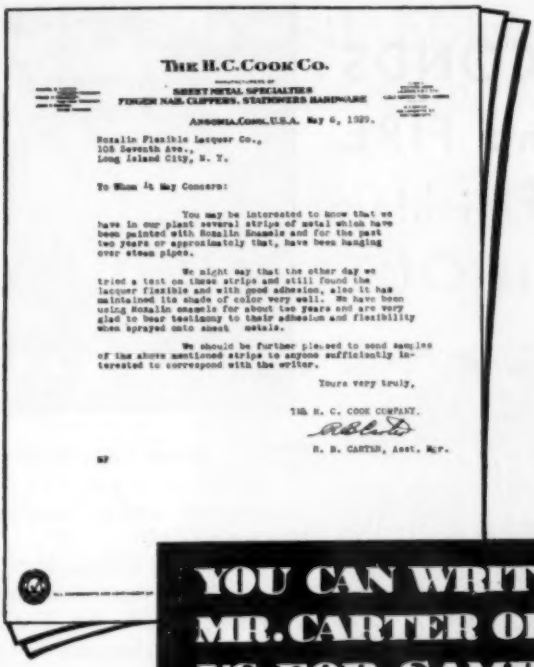

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ANSONIA, CONN. U.S.A. May 6, 1929.

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THE H. C. COOK COMPANY.

H. B. CARTER, Asst. Mgr.

HBC

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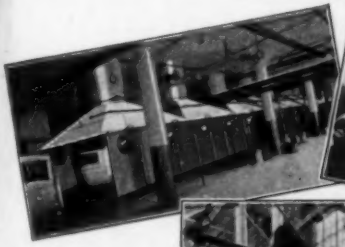

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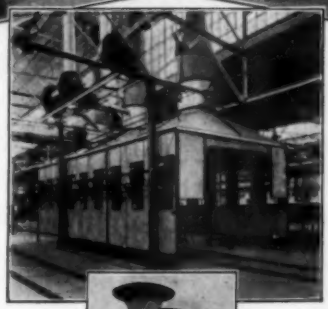

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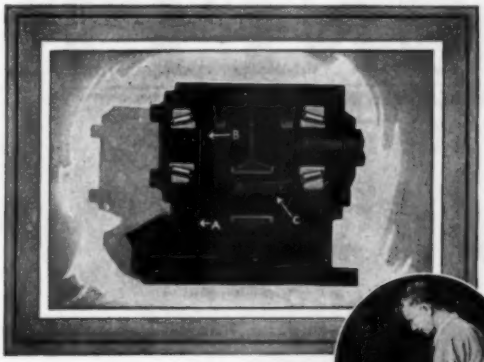

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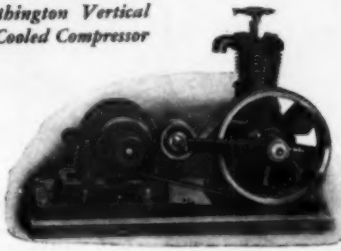

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PX-2—1 or 1½ H.P., 6 or 8.6 cu. ft. displacement.

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2nd—In low upkeep. Quincys are so well designed and made that repairs are negligible. And when they are required, easy accessibility keeps down the cost.

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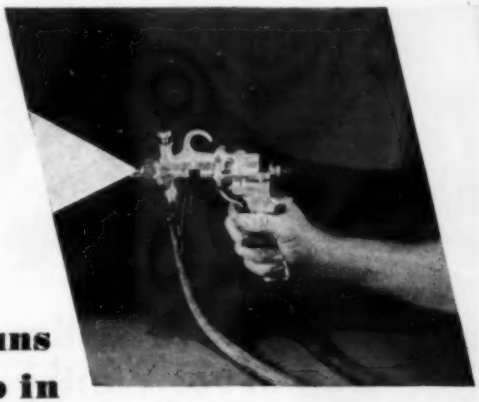

Spraco Guns do the job in less time— and do a good job with less material

In actual tests conducted in the plant of an Ohio company, an operator using different makes of guns using the same lacquer and spraying identical pieces—turned out 20% MORE WORK with the Spraco Gun than with any of the others—and laid on a smoother finish.

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Simple to adjust, operate and clean, Spraco Guns have many advantages not found in ordinary guns.

Please send a copy of Bulletin I-130 which describes Spraco Guns and complete industrial finishing equipment.

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INCORPORATED

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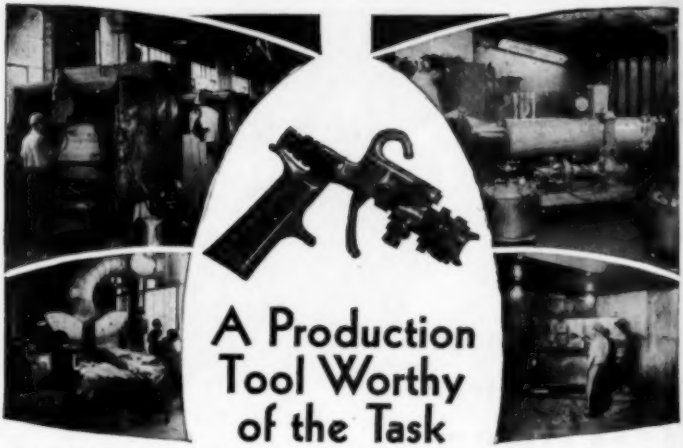

A Production Tool Worthy of the Task

SPRAY painting equipment used in industry today must measure fully up to the speed and efficiency of the most advanced production units in other departments.

DeVilbiss spray systems for use in industrial operations of all kinds - - metal, wood, leather - - are engineered with a complete understanding of the demands that will be made upon them.

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Paint Specifications Do Protect the Buyer

By
E. G. SANDER

This article was prompted by the article appearing in January issue of *Industrial Finishing* entitled, "Do Paint Specifications Protect Buyers?", which the author believes "gives the buyer of finishing materials an entirely wrong viewpoint of specifications and their value"

THE GENERAL opinion of the large users of finishing materials is that specifications protect the buyer—that is, when the buyer knows what his actual requirements are and draws up his specifications accordingly. Too many writers have recently taken the viewpoint that buying on specification is superfluous, and that dealing from a reliable concern is a sufficient guarantee for satisfactory materials.

Writers denounce buying on specification because the chemical composition does not give the information the user really needs and that to determine the ingredients accurately is an expense not justifiable to the average buyer. But in the consideration of specifications for the chemical composition of materials, they take up only one phase of specification work; they entirely overlook the physical properties of the material. The aim of this article is to show that small as well as large users can buy on specifications and have protection at a small cost, if they study these generally neglected physical properties.

Let us assume and admit that the buyer of finishing materials knows little of his chemical requirements—and really he need not be concerned with them. He is not interested in what the paint is made of if it does what he wants it to do. It matters little to him if the pigment is zinc white, white lead, or a complex combination of toners, fillers and gums. He need not worry if the vehicle consists entirely of linseed oil, or if it contains driers and thinners.

These are problems of the manufacturer and not of the user. While there is a varied opinion on this point, the average user should be guided in this day of complex lacquers, enamels, primers and surfacers, by the old adage that *a little knowledge is a dangerous thing.*

What Interests the User

What is most important to the user is the physical properties of the material. What the user wants to know is, "Will it dry in a certain time? Will it give a tough, elastic film and yet have good sanding and rubbing qualities? What is the viscosity and color, and how is the body, flow, coverage and adherence?" These are the qualities around which he should draw his specifications, and then he will have protection.

How can the user determine these physical requirements?

Which ones are of importance to him and how can he specify them?

The user of finishing materials has a number of factors which cannot be readily changed or disregarded at will. He has his equipment, production schedules and costs, and quality of workmanship to take into consideration. These things determine his requirements and point out to him the physical properties his materials should have. He need not have a staff of chemists to interpret these qualities when testing materials, as an experienced finisher can be easily trained to do the work.

The main point in passing upon the relative value of finishes is to know what properties to look for and to do it in a definite and systematic manner. If a chemist is employed—and every plant can use one profitably—he and the foreman finisher should be the final judges.

The Question of Color

Color may or may not be of major importance. If the finish is only for protection of the product, color is of no consideration, but if the finish is to serve for both protection and decoration, it becomes an important item. Some users have adopted definite standard shades for their products and demand that these be met at all times. Other companies have assembled products which are finished at different times. Slight variations in color are important to both of these classes. Color affects the sale of a product to the public more than any other single item.

Body; Viscosity; Flow

The body viscosity, flow, and covering qualities of the finishing material are important to all users, as they determine the method of application. The body and viscosity determine to what extent the material can be thinned and what air pressure must be used in spraying. The flow is the ability for the finish to level out, and it is important if quality is desired. It is a direct ratio of the time of application to the setting of the film. Covering power determines the opacity and the number of coats necessary to obtain the desired decoration and protection.

Drying and Sanding Qualities

The drying time is the time required to dry hard to touch or to become solid; baking time is the time to harden at an elevated temperature. These are always important items, as the drying rooms and baking ovens are expensive installations and generally the bottle-necks of production.

To have good sanding qualities the material must be hard and not clog the abrasive paper while being sanded to a smooth level surface. To have good rubbing qualities a varnish or lacquer must be dry enough to be rubbed to a dull finish. It must not be so soft as to sweat, or so hard as to require extra labor.

Durability; Protection

After the material is applied, the question arises as to the durability of the film or how long it will protect the product. This is governed by the toughness, flexibility and adherence of the film. Increased life of the finish can be attained by attention to these qualities. Chipping, chalking and poor adhesion are the causes of the breakdown of most

(Continued on page 62)

How We Finish Propellers

By
MILES H. FAIRBANK
Assistant to President
American Propeller Co.

"When we make a propeller as well as we know how, we depend on the finish to keep it so. For that reason we are constantly testing new methods, materials and combinations. The system used at present has resulted from countless, painstaking experiments and long experience."

THE finishing of airplane propellers constitutes a degree of craftsmanship, doubtless unequaled in the finishing of any other wood product. Not only must airplane propellers look good—they must wear well, and under the most trying conditions. An airplane propeller operates entirely out of doors, in all kinds of weather and variations of temperature. In operation it revolves at tremendous speed—often as high as 2200-r.p.m., therefore it must be kept in perfect balance—and this is combined with tortuous minute vibrations set up by the combined action of thrust and centrifugal force.

The finish on an airplane propeller must be flexible enough to take care of this strain without regard to atmospheric conditions. It must, above all things, be durable, for in addition to appearance, the wood must be thoroughly protected. Let a little moisture get into one blade and, Presto! you have a propeller out of balance and necessarily a trip

to the shop for rebalancing.

Paragon propellers carry a twelve month's guarantee of satisfactory service. It is evident therefore that we cannot afford to take chances on our finish. Our standard material is Northern white birch, and all propellers are finished "natural wood" unless color is specified.

Birch Wood Natural Finish

STEP 1: When propellers arrive in paint department from the woodworking shop, the first operation is cleaning off pencil or finger marks with fine sandpaper. The propeller now receives a coat of stain and filler combined, and then, after a few minutes, it is wiped off dry. Our stain is mixed with pigment ground in oil, for color, with small quantity of silica and a strict spar varnish as a vehicle, the whole mixture being brought to working consistency with pure turpentine.

Since birch is a hard, close-grain wood, the percentage of silica is governed accordingly. These propellers then set until the wiped-off stain is dry, and receive one coat of spar varnish reduced very little with turpentine, after which they are dried 15 hours. After this operation propellers go to the metal shop for the metal sheathing that is fastened on the leading edge. They then return to the finishing room.

STEP 2: Rubbed with fine sandpaper and steel wool; second coat of varnish applied; then allowed to dry in drying room from 18 to 24 hours. (Decal. trademark is put on at this time.)

STEP 3: They now are carefully rubbed with No. 00 steel wool, receive a full coat of spar varnish, and are allowed to dry in drying room 48 hours before shipment. Propellers for flying boats or other service—exposing them to excessive moisture—receive a fourth coat.

Oak Wood Natural Finish

Oak wood propellers require a heavier filler which consists of silex, boiled oil and a small quantity of spar varnish, with asphaltum for coloring, reduced with turpentine to working consistency. The same method is followed as in the birch, with this exception: After filler has been wiped off, the remaining filler on the propeller must dry over night on the oak. These propellers receive four coats of varnish.

Walnut Natural Finish

Walnut wood natural finish is handled the same as oak with less filler pigment and three coats spar varnish to finish.

Propellers in Color

On propellers to be furnished in color, the following method is used:

1—Primed with a full white lead, linseed oil and japan mixture. Allow to dry.

2—Sandpaper and coat with white lead mixture with small portion filler added.

3—Sandpaper and coat with full filler coat colored to suit the next flat finishing color.

4—Sand and coat with japan coach color.

5—Rub very light and second coat japan coach color.

6—When dry, the propeller receives the decal. and two coats of spar varnish, dries 48 hours and is ready for shipment.

NOTE: On very bright red jobs, we use some red lead in the filler mixtures to give us a good bright ground for the vermilions. Our filler is always gauged with white lead to insure durability.

Extreme care is exercised in applying each coat, in that propellers must be kept in absolute static balance. For that purpose, all operations are done on a balancing stand, as shown in the illustration accompanying this article. A propeller, if properly constructed, will be so delicately balanced that a slight spraying or brushing on one blade or the other will "throw it out."

Propellers are permitted to dry in a dustproof room adjoining the finishing room, where the temperature is maintained at approximately 80-deg. F. Spray equipment is used throughout for applying the varnish.

Numerous experiments have been tried with short-oil varnishes, colored enamels and lacquer; but, while some very gratifying results have been obtained and experiments are still being conducted, the above outlined process constitutes the best propeller-finishing system, in our opinion, that we can recommend at the present time.

Finishers Can Quit With Clean Hands

Finishers who do staining understand how difficult and almost impossible it is, after the day's work, to remove the water stains from their hands. There is an easy remedy which I believe many finishers will appreciate learning about.

If you have permanganate potash crystals in your finishing room and bisulphite soda, you have all that is necessary to have clean white hands at the end of each day's work.

Place in the palm of the hand about eight or ten crystals of permanganate potash, then put a little water on the crystals. Wash the hands with the solution which is a cherry red, covering all places soiled by the stain. Next take about one-half tablespoonful of bisulphite soda with a little more water and wash the hands. You will be surprised at the transformation. Do not use soap first as this retards the chemical action.

The permanganate of potash combines with the stain on the hands; then the bisulphite soda neutralizes the potash; result, clean hands and no injurious effect. Either of the above mentioned may be purchased at the corner drug store.—F. W. Purdon.

The beauty of the Art-Moderne lies in an excellent and well-chosen finish.

Arco Establishes West Coast Plant

The Arco Co. of Cleveland, Ohio, has selected Los Angeles, Calif., as the location for its new paint plant to serve the Western, Latin American and the Oriental trade.

A survey of western and export business conditions, made by Mr. S. D. Wise, President, and Mr. S. D. Well, Vice President, was responsible for the decision to construct a West Coast plant.

The plant will consist of three brick buildings with metal trim and concrete floor construction, totaling 16,500-ft. of floor space. The factory buildings will include a paint manufacturing plant 100x100-ft., a lacquer plant 50x100-ft. and a varnish plant 30x60-ft. The new plant's output will include the Company's complete line of paints, lacquers, varnishes, and enamels.

The new factory will be known as the "Arco Company Limited of California," and will be under the general direction of Mr. Howard Wise. Mr. Howard Raeney will be General Sales Manager, and Mr. E. B. Hagar, who has been Manager of the San Francisco Branch will be made District Manager with headquarters in Los Angeles. In addition to the Los Angeles Plant the Arco Co. operates factories in Cleveland, Ohio; and in Toronto, Ontario, Canada.

Finishing Fancy Woods in Moderne Furniture

By
JOS. A. MAIER

Foreman Finisher of J. L. Strassel Co., Louisville, Ky., decorators and manufacturers of special furniture, discloses some interesting information on finishing combinations of rare foreign woods in moderne furniture

"NOT HOW MUCH, but how good"—this could well be the title of the theme song significant of the spirit of our plant. We do not produce furniture in quantities. No two suites are alike and each piece is designed both as to style and size for use in a specific place, and with a well defined purpose in mind.

The finish, like the furniture itself, is predetermined and specified according to samples of the actual woods used. Various wood dyes and finishes are used on these samples until the correct shade is produced; the finished samples are then submitted to the decorating department for approval. All of this is done while the furniture is in the cabinet shop, and when it arrives in the finishing room, each finish is carried out strictly according to sample. Sections of these finished samples are sent to the rug, upholstering, curtain and drape departments, and to the decorator in charge of the particular job. The purpose behind all of

this is to produce an harmonious ensemble which will remain permanently attractive.

I have found by experience that success in finishing finely-figured cabinet woods, both foreign and domestic, depends largely upon the proper application of a few coats of well adapted finishing materials, rather than on how much finish is applied. Most figured woods, especially the foreign woods, have a clear deep brilliance that becomes clouded and obscured through the use of too much finish, especially if too much under coating is applied.

The dresser exhibited in this article has American walnut top, posts, bottom rail and drawer stiles. End panels are of African walnut. The two small top-drawer fronts are of satinwood, with the landscape pictures outlined in the wood. Large drawer fronts are of African walnut with a block inlay of ebony and boxwood. The center inlay design consists of a padouk oval with stump walnut (American) back ground and ebony outer border. Amber knobs and pulls are used on the drawer fronts.

With so many different woods of varying textures and colors it is obvious that something is needed whereby the stain and stain filler coats may be controlled. We accomplish this by applying a coat of oil sealer over the entire piece in the white. This sealer is clear, and it changes the natural color of the wood very little. After this is thoroughly dry, a walnut stain (alcohol) is applied on the fluted posts and bottom rail, and a walnut stain filler is put on all flat surfaces.

The fluted posts and bottom rail are not filled, as I have found that trying to fill a comparatively narrow fluted surface is a waste of time and material. Stain gives the wood the desired color and there is no clogging of the grooves with filler. The filler is immediately wiped from all inlaid surfaces, the sealer coat preventing immediate penetration. After wiping off the filler from the remaining surfaces, the piece is allowed to dry overnight and then all flat surfaces are sanded.

Finishing the Landscape

Next a wash coat of shellac is applied to the entire dresser; the surface is allowed to dry and then the landscape is outlined. The two top drawer fronts are colored with japan color made of drop black, green, blue and white lead. This is brushed on inside the cut lines of the scenes. The satinwood surface outside the lines is carefully wiped to assure a sharply defined line between the scene and the natural wood background.

It will be remembered that the natural wood surface is doubly protected by the sealer and wash coat of shellac. This decoration appears to be an inlay on account of the knife cut lines and the black color contrast with the light gold color of selected satinwood. After drying overnight, the entire piece is sanded; in this operation the landscape scenes are highlighted by sanding the lower portion of the scenes, especially the factory buildings, and the cottages a little heavier than the smokestacks and distant hills. This allows the light colored satinwood to show through giving a brown tone to this portion of the scene. Following this sanding operation, a coat of flat lacquer is applied. When dry, the lacquer coat is rubbed very lightly and the dresser is ready to be trimmed

and polished. I might add that these landscapes represent scenes in and around Pittsburgh, Pa.

Finishing Mirror Frame

The mirror frame used over the dresser is cut of 2-in. walnut, with hand carved designs at top and bottom. The first finishing operation is a brush coat of oil primer over the entire frame. After this has dried, there follows a brush coat of shellac paint—made by mixing dry white lead and shellac. This is allowed to dry about five hours and is then sanded.

The shellac paint is mixed fairly thin and is carefully applied to the carvings, since it is impossible, of course, to sand carvings without dulling the sharp edges, which are representative evidence of the carver's skill. A second coat of shellac paint is applied and, after drying about five hours, the frame is again sanded. Antique gold is brushed on the carvings at the top and bottom, and the lower half of the frame. Red lacquer is brushed on the entire upper half of the frame excepting the carving and, after drying two hours, black lacquer is brushed on the "halfmoons" cut into the upper half of the frame.

Pedestal Cabinet

The pedestal cabinet illustrated in Fig. 2, has an American walnut top and base. The three sides and door are veneered in a zig-zag pattern, the light colored wood being African walnut, while the dark wood is laurel. Both edges of the door are veneered in the same woods, carrying out the same design on all four sides of the pedestal. Inside the cabinet there is a polished copper humidor in the upper section. The lower section of the cabinet inside is finished in green lacquer, with green baize on the floor of the cabinet.

Fig. 2—Pedestal cabinet

The first operation in the finishing room is to apply a coat of oil sealer over the entire cabinet. When this is thoroughly dry, the carved base in American walnut is stained with a walnut stain (alcohol) and the top is filled with a stain-filler to match the base. The African walnut on the sides of the pedestal is filled with a light-colored stain-filler. After this filler is wiped off, a dark stain-filler is worked into the laurel. This makes the zig-zag pattern more pronounced by emphasizing the contrasting colors.

Due to the application of the oil sealer coat and the light stain-filler on the African walnut, the dark stain-filler is easily controlled when applied to the laurel. If any of the dark stain-filler overlaps the line between the two woods, it can be easily and quickly wiped off the African walnut so that a clear well-defined line separates the two. This is

allowed to dry overnight; then the surface is sanded, followed by one coat of flat lacquer. The lacquered surface is lightly rubbed and polished. Other pieces in these suites contain zebrano, lacewood, English harewood and madrone, and all are finished in practically the same manner. The process is simple and, while the number of coats of the various materials may seem few, I have found that this procedure on combinations of fancy woods produces a pleasing and durable finish without obscuring the natural beauty of figure, color or brilliance of these woods.

Rubbing and Polishing With Cane Shavings

One of the principal objections to the use of water stain is the inevitable after effects—"raised fibers" presenting a fuzzy or rough surface. With the use of water stain there is ever present the problem of trying to counteract the effect of wet stain on the wood fibers.

In the staining of birch and other close-grained woods, the common practice is to coat with shellac, etc., then sand off the raised wood fibers, all this requiring considerable more labor than when oil stain is used; often too, the finisher is obliged to touch up and blend out certain "raw spots." Those who have tried to sand the stained surface found that the results were not satisfactory.

Some time ago I was shown a fairly simple method which eliminated, to a large degree, the troubles just mentioned, and since then I have continued the practice with satisfactory results, particularly where close-grained woods are used. The idea is to rub or polish the wood before the first coat, using cane shavings, commercially called "cane rub."

This material resembles excelsior or so-called wood wool in character but is not as brittle or as coarse in structure. Cane rub is made by shaving the outer bark of rattan which is used in the manufacture of reed for reed furniture. One side of a strand of this cane rub is smooth while the reverse side has a shredded appearance.

When rubbing with this material, it should be used just like steel wool, working with the grain. Its action is to roll over the wood fibers, packing them into the pores instead of cutting them off, which gives a smooth polished effect. A wood surface that is cane rubbed requires very little more sanding, if any more, on the first coat than when an oil stain is used. In addition, the first coat does not soak into the wood nearly as much, thereby sealing the wood surface better, with a resultant better-bodied finish.—D. M. Martin.

The use of finishing material open-top containers develops dust catcheries, causes heavy evaporation, slop losses and non-uniform coatings, due to variance in the amount of enthusiasm behind stirring sticks operated by hand.

Paasche's K. C. Branch Managed by T. C. Nichols

The Paasche Airbrush Co. announces that "Mr. T. C. Nichols is now manager of the new Paasche Airbrush Co. branch located at 609 Linwood Boulevard, Kansas City, Mo. Mr. Nichols has had many years experience in airfinishing and airpainting and will render an unusually high type of service to all users of air finishing equipment in this territory. A stock of repairs will be carried for quick service to users, dealers and jobbers."

New Uses Revealed for Spray Equipment

By
D. C. YEOMANS

What an extensive survey disclosed about some of the possible and little known uses of spray painting equipment in factories, refinishing shops and many types of business establishments including numerous places of entertainment

IN ORDER to widen the market for their products and to offer their jobbers and dealers greater merchandising help, a representative spray gun manufacturing company of Los Angeles, Calif., has just completed an extensive survey of spray painting uses.

This survey was conducted under the head of a sales research department established for the purpose of accomplishing three things, namely; discovering new uses for spray painting; second, to find new means of adapting spray painting to existing finishing work; and third, to use the knowledge thus gained in first hand contact with the actual use of spray painting equipment to engineer this company's products to fit the specialized needs of its users.

The investigation was carried on in a field well diversified as to type of industry represented, and the nature of products manufactured by these industries, in order that the findings would be typical of other sections of the country and thus prove sound merchandising information for national jobber and dealer sales assistance.

The sales research department started its work by dividing prospective spray-painting equipment users into five general classifications, as follows: manufacturers, wholesalers, retailers, refinishers and maintenance departments. By conducting research individually into each group, a better opportunity was afforded to segregate and classify the problems of the individual group as a whole.

In Numerous Factories

The first division, that of manufacturer, revealed innumerable possibilities for spray painting. Frequently finishing departments were found to be employing costly hand-finishing methods which materially increased overhead and lessened speed in production. Instances of this were discovered among manufacturers of millinery, coasters, baby carriages, toys, lawn mowers, caskets, billiard cues, mail boxes, trunks, lacrosse sticks, tennis rackets, electric motors, golf clubs, sleds, wagons, and playground equipment.

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In the case of the millinery manufacturers, spray painting was rapidly adopted for the finishing in color of straw hats and for applying stencil designs. A local manufacturer of jointed wooden toys, dissatisfied with the results as well as the slowing up of production in the hand-finishing method, installed a few spray-painting outfits as an experiment. The survey showed that this equipment not only paid for itself in the saving of wages, but since the finishing department had been completely equipped with spray guns, production increased 400%.

Retailers' Refinishing

In the second and third groups, wholesalers and retailers, it was found that many of them were confronted with the expensive problem of refinishing merchandise returned for credit or used for display purposes, in order to make it salable. Much of this work, it was discovered, is still being done by hand. Unusual opportunities for the sale of spray-painting equipment were found among the wholesalers and retailers of furniture, radios, pianos, office machines, electric lighting fixtures, washing machines, refrigerators, sewing machines, and furnishings of various kinds.

Refinishing Specialists

The fourth division, that of businesses specializing in refinishing work, did not offer as many potential possibilities for spray painting due to its close contact with the paint field, and its alertness to new developments and processes within its own profession. It did, however, offer suggestions for the simplification of present operations and the adaptation of spraying apparatus to meet special working conditions.

Maintenance Finishing

Investigation of the last group showed that spray painting holds an important place in maintenance work. It was discovered that a great number of apartments, office buildings, hotels, clubs and hospitals, have cut their cost of upkeep by fitting up an unused space in the basement as a dustproof room for painting. The building carpenter or janitor, equipped with a spray-painting outfit, can in his spare time, refinish furniture as necessary, without loss of rental time and profit to the building.

In one of the large hotels in Los Angeles, the house painter goes over the building periodically with a portable spray gun, painting any floor surfaces in front of elevators, doorways and staircases that show wear from foot traffic, and refinishing marred or soiled walls and woodwork. This not only keeps the hotel in the best of repair, but does away with too frequent closing of rooms for redecoration.

Steamship lines, as well as the U. S. Navy, use spray-painting equipment almost entirely to simplify their maintenance problems. Both moving picture and legitimate theatres were found to be employing spray gun painting, not only for the redecoration of stage scenery, but to eradicate signs of wear and tear about the building. Commercial airplanes, motor busses and the truck fleets of department stores, laundries, gasoline companies and storage concerns, the research showed, are also maintained with this equipment.

Miscellaneous Uses

Several interesting uses, which perhaps do not fall under the fore-

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going five divisions, are worth noting since they indicate the trend toward finding new means of adapting spray equipment. Among these are; the application of liquid insecticides, for doing spot work in laundries and cleaning establishments, and to speed up automobile washing in garages and service stations.

Motion picture studios in Hollywood have used this method of painting for years with satisfactory results, and several unusual examples of the variety of ways in which the equipment is being employed were disclosed by this survey. To offset loss of time and consequently increased production costs, in pictures calling for mob scenes of many hundred extra players, "make-up" is no longer applied by hand, but sprayed on with guns. Mist or foggy effects are produced with the aid of a number of these outfits discharging a fine spray of thin oil. Fire is simulated in the same fashion with the use of the chemical-lycopodium.

Spray guns were used recently in a novel stunt in conjunction with the premier showing of the "Hollywood Revue of 1929" at Grauman's Theatre in Hollywood. The final scene of this picture was set in an orange grove, and in order to add realism to the screen's portrayal, the air was scented with orange blossom perfume, vaporized through guns concealed about the interior of the theatre.

A Touch-up Material for Light Edges

After the operation of hand rubbing has been completed on a finished piece of work, one often finds, on mahogany and walnut finishes especially, many light edges. Some of these are caused by cutting through the lacquer or varnish in rubbing; at other times the cause of these light edges may be traced back to the "size sanding" on the stain, or the sanding of sealer or varnish coats. It is necessary, therefore, that these light edges be touched up. The touch-up generally used for this purpose is made of shellac and alcohol, with spirit nigrosine and Bismarck brown as the coloring agents.

This type of touch-up wipes off the edges very easily. It also has a tendency to change color, leaving a greenish cast where applied.

A touch-up giving better results for this purpose—for that of lining light edges after the hand rubbing (or polishing, if polishing is done)—is made of colored lacquer enamel red and black thinned to a working consistency with reducer; if too strong in color, it may be reduced in strength by the addition of clear lacquer. For use on mahogany, it may be made as follows:

Red lacquer	1-oz.
Black lacquer	2-oz.
Clear lacquer	2-oz.
Reducer	4-oz.

This may not suit your exact color requirements for mahogany, but its color may be controlled by the proportions of red and black lacquer used.—F. W. Purdon.

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DU-PROS Pure Shellac has twice the solid content of many materials sold for first coaters. Since the solvents of pure shellac and of most first coaters evaporate rapidly, your money really buys only the solid content remaining on the finished surface. When it is reduced half and half, Du-Pros Pure Shellac still has as much film-building solids as the other materials in the original consistency. A simple calculation shows Du-Pros to be worth twice as much from this standpoint. Du-Pros Pure Shellac needs little sanding. The exclusive double process by which it is made produces a smoother, finer shellac that is now priced unusually low.

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Appreciating such individual needs, the Lilly laboratory staff gives the most conscientious and sympathetic attention to every industrial finishing problem. Using only quality materials, which have passed rigid laboratory tests and have met definite and absolute standards of chemical formation and performance, a special formula is developed to meet most perfectly the particular requirements involved. Once this made-to-measure formula is established, it becomes a matter of absolute record. In manufacturing, every detail of such a formula in materials and blending is rigidly observed, and every mix is carefully checked against approved samples which are kept on file. Thus you have a positive assurance that the first satisfaction will be absolutely duplicated on each succeeding order.

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Masking Tape—Some of Its Uses and Possibilities

By DENIS O'BRIEN

Expert Finisher with Service Department of Fairchild Airplane Corporation calls attention to some of the merits of masking tape and explains how it simplifies the work of lettering and decorating airplanes

THE use of masking tape has reached considerable importance in connection with finishing and decorating operations in many factories. As a matter of fact I believe that lacquer would not have attained its present popularity, for many classes of work, were it not for the merits of masking tape.

I recall an experience back in 1913 when I first realized the need for some kind of masking material in connection with my work. At that time I was master painter for the Brooklyn-Manhattan R.R. Co., and a job came along that presented a real problem. The company had built 100 steel cars —its first departure from wooden coaches—and I had these to paint.

Every car was equipped with steel tubing stanchions placed in the center, and these stanchions had to be painted white. We tried to get a vitreous enamel-ware company to do the job, but for some reason they turned it down; as a result we decided to do the job ourselves.

We tried bringing up the work in flat whites and then finishing in white enamel varnish; we also tried long-oil enamel and gum enamels, but none of them were satisfactory. One day a "virtual miracle-man" came into the shop and demonstrated a spray gun with cup container attached. We sprayed on a coat of a white lacquer which dried hard in ten minutes.

The interior of the coach was finished in para red, and after we shot the stanchions, we found our beautiful para red freckled with white. There was no masking tape available in those days (so far as I know), so before spraying the white, we would rub some cheap commercial vaseline over the parts of the car which otherwise might become speckled with the mist or overspray of white.

It was a tough job to sell lacquer to a railroad company in those days, and the lack of adequate masking facilities was one of the reasons. Today no shop where painting, doping or lacquering is done can get very far without the use of masking tape.

In the airplane factories and refinishing shops, masking tape is a factor of considerable importance. It is used in conjunction with paper for masking the windows, and masking the fuselage when the job is a two or three-tone color scheme.

Its uses are many and varied. For instance, one often sees an arrow pointing in line of flight, on either side of the fuselage.

This arrow is first marked out with crayon; then masking tape is pressed on the crayon line, after which the dope or lacquer is applied. The result is a neat, clean-cut job.

Nor does the company require an experienced letterer to place the license numbers on the wings. Anyone can draw the outlines of each letter or numeral with a straight edge, and then mask and spray on the color, or whatever is required. The circular sweep back from the cowl to the fuselage, as you see on the Fairchild airplanes, is put on with the aid of masking tape.

There is no end to the schemes of decoration that can be aided by the skillful use of masking tape. But in selecting tape, it is well to choose it for its merits and adaptability to the work required, rather than to be influenced by low-price appeal. I have used (or tried to use) tape which would be costly if it had been supplied gratis.

Heavy fabric tape might be adaptable for certain phases of industrial finishing, but I prefer a light-weight fabric tape for my work, which now consists of airplane service finishing and refinishing. The light tape can be turned into circular shapes much better than the heavy tape.

The adhesive properties of the tape are very important, for if adhesion is not perfect, the tape will be loosened up by the air pressure of the spray gun and, when it is removed, an ugly job is presented. Some tapes, when peeled off, leave a mucilaginous film; others do not; however, it is an easy matter to remove the sticky substance with gasoline.

Custom Finishing Furniture

By
JOS. C. COYLE

What finishing equipment, materials and methods are used and how they are used in a Denver establishment that does considerable custom furniture finishing for the local retail trade

A LARGE PART of the activities of the Colorado Bedding Co., Denver, Colo., consists of finishing furniture in accordance with customer's orders. A brick building 125 x 125-ft., of which 25 x 125-ft. is taken up by the finishing department and the other 100 x 125-ft. by unfinished stock, houses the furniture department. Another similar building 100 x 125-ft., is used for offices and the manufacture of bedding.

Pioneers in the lacquer finishing of breakfast sets, having adopted this finish seven years ago, the company has attained a reputation for articles of quality, finished for all dealers in the Rocky Mountain region.

Although many orders from dealers have become more or less standardized, the variety in finishes demanded by customers is a feature of the operations in the finishing department. Orders call for duplication of many different colors and blends in finish. About 50 finishes are produced regularly, besides a great variety

Why not cut out Guess-Work ?

ARE you buying your Stain from one company, Filler from another and Lacquer or Varnish from still another? If so these various parts of your finishing system do not fit together. Chemically no two Stains are alike, no two Fillers are alike, no two Varnishes are alike. When you use one company's Stain and another company's Filler with a third company's Varnish the result is Guess-Work. Attempting to put together several "unknowns" causes the majority of finishing troubles.

Competition is sokeen among finish users that expense must be cut — but the quality of the finish maintained. This best can be accomplished by concentrating on one supply house for a properly balanced and complete finishing system.

Marietta is particularly well equipped to furnish the complete finish. Send us your specifications, we will be glad to work out a finishing schedule for you. Also ask for our Bulletin on Buying Wood Finishes — it is of special interest to Executives.

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of specials. Lacquers are carefully blended and tested out for special jobs. Three-color breakfast sets and high chairs are finished in large quantities, and the methods employed in their production are particularly interesting.

All stock is received "knock-down," and is assembled before finishing—excepting tables, for which the legs are finished singly and packed with the top, and special orders for refinishing some particular article in a certain style. Operations in the finishing begin with the puttying of any irregularities in the surface

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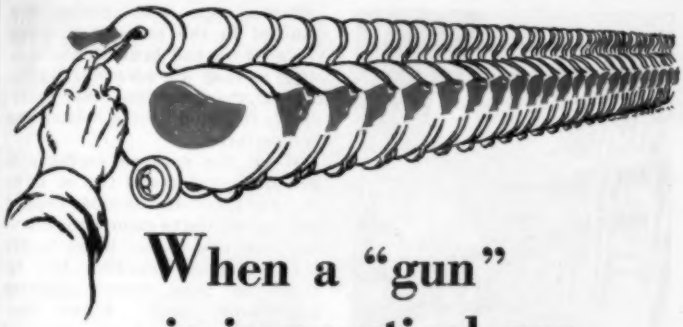
Combination Numbers	Color of Bases	Color of Tops	Trimming Color
*2	Cream Blended in Chocolate Brown		Orange
*4	Cream Blended in Marine Blue		Orange
5	Steel Gray	Dimity Blue	Orange
6	Cream	Dimity Blue	Orange
11	Cream	Amulet Green	Black
12	Galloon Yellow	Apollo Blue	Black
14	Snow White	Pango Blue	Royal Blue
*17	Snow White	Pango Blue	Blended in Roman Gold
*18	Snow White	Pango Blue	Blended in Gloria Silver
20	Cream	Steel Gray	Orange
24	Samuri Orange	Steel Gray	Black
25	Chestnut Brown	Reville Green	Violet
26	Aulay Brown	La Crosse Brown	Orange
27	Cream	Pango Blue	Orange
31	Cocoa	Normandy Green	Nankeen Red
32	Cream	Dasha Rose	Black
34	Dasha Rose	Normandy Green	Black
35	Cream	Normandy Green	Emerald Green
*Larchmont	Chestnut Brown	Reville Green	Blended in Chocolate and Orange
*Mayfair	Amulet Green, blended in Crow Black		
*Edgemere	Nankeen Red, blended in Crow Black		
*Canton	Crow Black, blended in Nankeen Red and Roman Gold		
*Mandarin	Nankeen Red, blended in Amulet Green and Roman Gold		
*Berkley	Chestnut Brown, blended in Reville Green and Fire Gold		

*A Blended Finish, and Cannot Be Finished Any Other Way



When a "gun" is impractical use

S-W Industrial Brushing Lacquer

Drawing in the eyes on a toy duck . . . striping or lettering . . . coloring up the vestibule floor of a railway passenger coach . . . there are hundreds of uses where you need the quick drying characteristics of lacquer but where a spray gun is impractical.

Then is the time to think of Sherwin-Williams Industrial Brushing Lacquer!

For a quick job where the surface must go back into service quickly —for fine markings and lines where you need quick drying and "one coat" covering you will find this brushing lacquer ideal for any surface on any material.

S-W Brushing Lacquer for industrial use sets dust-proof in a few minutes . . . is ready for handling in an hour . . . has a natural high gloss . . . doesn't pick up the undercoat or print. Most colors are opaque with a single coat. A wide range of colors available.

Look over your present paint and lacquer uses for one or more places where this brushing lacquer might save time and money, then write us for complete information. The Sherwin-Williams Co., Dept. 708, 601 Canal Road, N.W., Cleveland, Ohio.

SHERWIN-WILLIAMS

Industrial
Brushing Lacquers

Chairs on shelf, and table tops below, are drying after having been spray finished at booths on the opposite side of this narrow room.

of each article, using rock-hard putty. Flat surfaces are then sanded with a portable electric sander, while legs, chairs, etc., are smoothed up with a portable rubbing and polishing machine.

Chairs are then lined up in a single row on a long 24-in. shelf at the side of the room. Below this long shelf, the table tops are placed on portable wooden stands about 30-in. high, each stand having a padded top and castors. These are also lined up, beneath the long shelf. Table legs with a small staple driven into one end of each are hung in a portable rack. With this rack placed in front of a spray booth, the operator removes one table leg at a time, sprays it with a sanding-surfacer and hangs it back in place. When the rack load is finished, the rack is moved to the back of the room to dry.

Table tops and chairs are handled in the same way, being replaced on and beneath the long shelf as they are sprayed. In the case of the table tops, this operation is repeated for the bottom and top surfaces.

When the sprayed surfacer is dry, it is sanded and two or three coats of pigmented lacquer enamel are applied in the same way, allowing from one to two hours to dry between coats—sanding the articles by hand before applying succeeding coats. When completed the articles are removed to the packing room, where the table tops are stored in specially constructed racks until they are ready to pack.

Table legs hanging from wires of double-deck, portable rack; only part of the rack shows in this view.

Furniture for local trade is all set up before leaving the plant. Tables for shipping are wrapped, "knock down," in excelsior pads and packed in cartons. All chairs are set up and packed two

Beauty..

that was never the result of luck!

BREEDING and training, for generations back, produces the flawless beauty of the thoroughbred.

So it is with du Pont finishes. Years of devoted effort on the part of expert chemists and engineers . . . ceaseless testing and experimenting, constant research . . . these things, not chance, produce the perfect beauty of Duco and all other du Pont finishes.

This is only reasonable when you consider the resources of the du Pont company, with its research and development organization, and with laboratory and manufacturing facilities second to none in the world. It is this organization, these unequalled facilities, that give Duco, Du Lux Varnishes, du Pont Wood Lacquers, 1985 Sealer and other du Pont finishes the unquestioned leadership they now enjoy.

8 QUICK FACTS
that explain the leadership of du Pont finishes

1. Vast research and development organization.
2. Rigid laboratory control of all products.
3. Unequalled manufacturing facilities.
4. Technical chemical service.
5. Technical engineering service.
6. Sales and service organization.
7. Warehouse and delivery service.
8. Color advisory service.

FINISHED WITH DU PONT DUCO

The Duco Oval on tag or seal helps buyers identify a Duco finish on many leading lines of furniture.

E. I. DU PONT DE NEMOURS & CO., Inc.
Industrial Finishes Division, Parlin, N. J., Chicago, Ill., San Francisco, Cal., Everett, Mass., Canadian Industries Limited, Paint and Varnish Division, Toronto, Ontario, Canada

DUCO . . . made only by du Pont

to a carton in the same way.

In finishing walnut and mahogany, a combination stain-and-filler is applied with a brush and then wiped off. When dry, two or three coats of clear lacquer are applied by spraying, allowing a drying period of from 1 to 1½ hours between coats and rubbing after each coat, except the last, with No. 000 steel wool. Due to the nitrocellulose base in all finishing materials used, this finishing process is very rapid, some articles having been completed in 2½ hours time.

The spray equipment includes five 4 x 4-ft. spray booths, each being equipped with an exhaust fan and two spray line connections, so the operator can instantly switch from the wide spray for large flat surfaces to the slender spray for turnings and edges, or for shading. Also, a 4x10-ft. spray booth, with two exhaust fans, is available. Special orders are sometimes received from department stores, and on orders of this kind lacquers are carefully blended and tried out until the right combination is obtained before starting on that particular job.

During the several years this company has been in business, a large variety of standard color combinations have been worked out. A list of the current ones appears each year in the annual catalogue. This usually includes some of those from the previous year and a number of new ones. The dealer, therefore, has a variety of new combinations to choose from every year, but if he desires an exact match of a previous order, the color combination is easily found by referring to the catalog of that year.

Information About All Finishing Materials

The Philadelphia Lecture Course, sponsored by the Paint and Varnish Superintendents Club of the Philadelphia District, was inaugurated in the Harrison Laboratory of the University of Pennsylvania, on the evening of October 29, 1929, by Fred J. Meyer, whose topic was "Natural Resins," and E. C. B. Kirsopp, who described and explained the "Synthetic Resins." This has been followed by nine other dual lectures by competent authorities, and the series will be completed with two additional topics which are to be presented on March 18, April 8 and April 22.

The entire course, in non-technical language, presents a comprehensive and intimate picture of the paint, varnish and lacquer industry, from raw materials to final use. Immediately on completion, bound copies of the entire course, with discussions following the delivery of each lecture, will be available in cloth bound mimeographed copies at $5.00 each to those who place their orders in advance. Orders, with checks, should be sent to Dr. J. S. Long, Lehigh University, Bethlehem, Pa.

SAN-ITAI-RIE FILLER

Pat. No. 1658605

For All Defects in Wood

Manufacturers in all wood-using industries find SAN-ITAI-RIE FILLER unsurpassed in filling cracks, worm holes, knot holes, open joints, dents, pitch pockets, etc., and through its use are able to send out their products without a flaw.

Put up in friction top cans—half pints to gallons—in 20 different colors. Send for sample can.

SAN-ITAI-RIE FILLER CO.

Division of

164-170 W. Kinzie St. G. J. Liebich Co. Chicago, Ill.

Kindly mention INDUSTRIAL FINISHING when writing advertisers

Aircraft Finishing Today

By
H. C. LEWIS

What an Aeronautical Finishing Expert has to say about finishing the structural wood and metal parts and fabric-covered surfaces of modern aircraft.

ON ACCOUNT of the fact that the aeronautical industry is comparatively new, very few aircraft manufacturers have established facilities for testing finishing materials. In consequence, the standard of quality established by the specifications emanating from the U. S. War Department, has come to be recognized as the criterion of the industry.

The aeronautical testing laboratories of the War Department are located at Wright Field, Dayton, Ohio, and all tests are made at that point. Wright Field is thoroughly equipped with men and equipment to test finishing materials in a practical and exhaustive way. It is impossible to get an approval on any material which is not strictly up to their high standard in every detail.

It has been the practice of some manufacturers of finishing materials to secure approval on a few items and use this as a talking point in selling inferior goods. In other words, they manufacture two lines—one a government standard line, and one a commercial line of inferior quality. Although it may appear on the surface that the airplane manufacturer is saving money by buying the commercial grade of finishing materials, this is an erroneous deduction, inasmuch as the cheaper goods require more coats to get the same thickness of film and probably deteriorate more rapidly than the Government standard materials.

For a time, many commercial plane manufacturers were buying finishing materials strictly on a dollar and cents basis, but the turning point has come and the larger and better established companies are coming to the realization that the best is none too good to put on an airplane.

Finish For Fabrics

The fuselage and wings of most airplanes are covered with what is known as "Army & Navy Standard Grade 'A' Cotton Fabric." One requirement of this material is that it be of 80-lb. tensile strength.

The finishing materials applied must increase rather than decrease this tensile strength. The object of finishing fabric is to seal the pores, tauten the fabric and protect both the fabric and the interior structure of the wings and fuselage from the elements.

So far as I know, the best finish developed up to date, and the one which furnishes the best protection at a minimum weight, is the following:

Clear Nitrate Dope....2 brush coats
Clear Nitrate Dope....2 spray coats
Pigmented Nitrate Dope.2 spray cts.

The reason for brushing the first two coats is to thoroughly impregnate the fabric with the dope and also to lay the nap of the fabric, in order to cut down wind friction.

Some manufacturers of the cheaper type of plane are using what is known as a "semi-pigmented dope" from the fabric up. This semi-pigmented dope contains about 25% of the pigment which is used in a fully pigmented dope. Fabric can be finished with two brush coats of semi-pigmented dope, followed by two spray coats of semi-pigmented dope. This, of course, cuts down the finishing cost, both in labor and material, but it likewise produces a less-smooth surface and a less-durable one, due to the thinner film of the finishing material on the fabric.

Some commercial manufacturers prefer a higher gloss than can be secured through the use of dope alone, and they are using a coat of clear gloss top-coat lacquer, or semi-gloss lacquer enamel as a final coat—but these finishes are not as durable as the straight dope finish, inasmuch as lacquers will not stand the vibration of an airship as well as dope will.

One of the points in which aircraft finishing differs from the finishing of almost any other object, is that every part, whether exposed or not, must be protected against the elements. As a matter of fact, it is more important that the hidden parts be fully protected than the exposed ones, as should an unexposed member become weakened in the course of time, it is liable to part and cause a crash.

Inside Steel Tubing

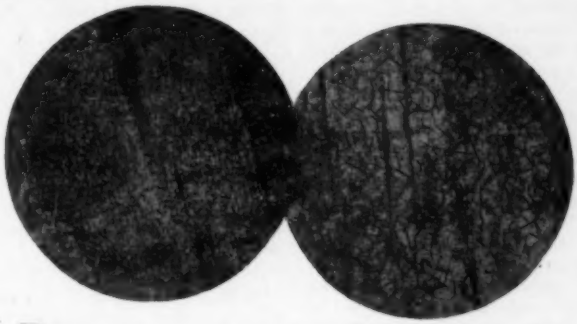
Most fuselages, at the present time, are constructed of seamless steel tubing which is welded together at all joints. After the entire fuselage has been welded, a 1/16-in hole is bored at one end and a corresponding hole at the other end. Through one of these ends a rust-preventative finish is forced in until the entire tubing is filled. The second hole mentioned above is, of course, the air vent.

After the tubing has been completely filled, compressed air is applied to the air vent, forcing out all the excess material through the original point of entry. These two holes in the tubing are then hermetically sealed, leaving a protective coating on the entire interior of the tubing.

At one time, hot linseed oil was the accepted standard of finish for the interior of tubing, but at the present time, a product such as heat-treated China wood oil is generally used, as it eliminates the necessity of heating and also forms a better rust-preventive finish than linseed oil.

All wooden parts, such as spars and ribs of wings, are protected with three coats of a high-grade spar varnish.

The aluminum and duralumin parts of aircraft are usually finished with one coat of a high-grade primer, followed by two coats of an oil enamel or, if time is a fac-



REZYL Lacquer Outlasts Spar Varnish

Which finish would your customer choose? Notice that even Spar Varnish cracked after seven months of exposure. Exposure under identical conditions scarcely touched the lacquer film formulated with Rezyls! The same kind of wood was used for both panels.

Many similar tests establish the extreme durability of Rezyl-formulated lacquers. Exposed to ultra-violet light, Rezyl lacquers, clear or pigmented, outlast other films as much as three to one.

In addition to imparting durability, Rezyls are true solvents of nitrocellulose. In all proportions they reduce the nitrocellulose requirements, and are entirely suitable for lacquers to be used for finishing and refinishing wood and metal for indoor and outdoor service. Many lacquer users are now getting these excellent results from Rezyls in their clear and pigmented lacquers.

Investigate Rezyls. Let us send you complete information on this and our other lacquer ingredients: Rezyl Balsams for plasticizing; Teglac for furniture lacquers; and Ethyl Lactate, a high-boiling solvent. Use the coupon for convenience.

Industrial Chemicals Division

American Cyanamid Company

535 Fifth Avenue New York

CYANAMID PRODUCT — AERO BRAND

Sole Sales Agents for NITROCELLULOSE Manufactured by our Subsidiary AMERICAN POWDER CO.

AMERICAN CYANAMID COMPANY,
535 Fifth Avenue, New York.
I am interested in Rezyls, Balsams, Teglac, and/or Ethyl Lactate for the following applications:

( ) Sanding Sealer
( ) High Gloss Furniture Lacquer
( ) Clear Lacquer (refinishing automobiles, etc.)
( ) Pigmented lacquer for general industrial work
( ) Pigmented lacquer for automotive work
( ) .....

Name .....
Address .....
Mark for attention of .....

tor, lacquer enamel is used. The primer must be of great durability, as some of the parts which are coated do not receive any further protection, consequently the primer must withstand the weather.

Dope-Proof White

As stated above, the structural members of an airplane are finished before the fabric is applied. When the fabric is stretched, it comes in contact with certain of these structural members, such as leading and trailing edges of wings, edges of ribs and so forth. When dope is applied to the fabric, it penetrates clear through, and if some precaution was not taken, the solvents of the dope would destroy the finish on the structural members.

For this reason, the U. S. Army uses a material known as "dope-proof white." This is applied with a brush on all parts which will later come in contact with doped surfaces. It dries sufficiently hard in less than four hours to permit the application of dope over it, without danger of the dope cutting into the dope-proof white, or to the finish beneath.

All finishing materials used on aircraft should be the best that it is possible to obtain, as the difference in cost per plane can be but a few dollars, but the difference in durability may mean months or even years in the life of a plane. When a man pays several thousand dollars for a ship, he has a right to expect a serviceable protective finish rather than a showy job which will fail in a short time and require recovering and refinishing. The aircraft industry is becoming just as competitive as the automotive industry and satisfied customers are going to be the best form of advertising that can be found.

Safety features are important in new equipment.

Modern conveyors give line production in any plant.

New equipment? Yes, but make sure you also find out how to operate it efficiently.

Cost-cutting makes price-cutting possible, but without lower costs, price-cutting becomes folly —in most cases.

The ultimate consumer prefers articles that are attractively designed, correctly styled and which have real intrinsic merit.

The heart of any directly motored device is the motor. A little attention and cleaning reduces motor repairs surprisingly.

Cook Paint & Varnish Co., Changes Detroit Address

A notice from the Cook Paint & Varnish Co., St. Louis, Mo., announces change of sales office to its new Detroit factory, 3301 Bourke Ave., telephone Hemlock 1000, effective April 1.

Hercules Elects Officers

Officers for the ensuing year were elected at a meeting of the directors of the Hercules Powder Co., in Wilmington, Del., on Mar. 26. The officers elected were as follows: R. H. Dunham, president; J. T. Skelly, vice-president; T. W. Bacchus, vice-president; N. P. Rood, vice-president; C. D. Prickett, vice-president; G. G. Rheuby, vice-president; C. A. Higgins, vice-president; C. C. Hoopes, treasurer; E. B. Morrow, secretary.

The directors voted the regular quarterly dividend of $1.75 on the company's preferred stock, payable May 15 to stockholders of record, May 3.

SPRUANCE QUALITY PRODUCTS

VARNISHES UNDERCOATERS
LACQUERS WOODFILLERS
ENAMELS STAINS

A *really* satisfactory Lacquer Wood Filler that dries to recoat in 3-hours

[1.] Fills satisfyingly — leaving the pores full, flush and well padded.

[2.] Cleans off specklessly and *dries thoroughly* for lacquer and varnish in *three hours.*

[3.] Forms a permanent, perfect supporting-base for the finish — and will not shrink in the pores when exposed to wear.

TRY IT — AT *OUR* EXPENSE

One trial will *show* you more than we can ever *tell* you. A request (on your business stationery) will bring a 5 lb. sample — prepaid.

THE GILBERT SPRUANCE CO.
Manufacturers Wood Finishing Products
PHILADELPHIA, PA.

"A finer finish for every surface"

Speeded-Up Finishing Schedules

By
M. M. MILLER

Former and present-day finishing schedules on hardwood furniture; how the present shortened schedules are made possible through the use of modern materials, equipment, supplies and methods.

THE MODERN trends in all fields are far-reaching, and there is nothing to do but fall in line. Those resisting are soon lost in the shuffle and lose out in the mad race with their competitors. Mass production, speeding up, the hand-to-mouth policy of buying—these have long since reached into the finishing room, as everywhere else and this, combined with lack of space caused by the growing need in all woodworking factories to increase their shipments, to maintain the same profits and the desire to keep inventories of work-in-process as small as possible, has served to quicken finishing schedules everywhere.

The development of lacquers and quick-drying varnishes cut considerable time from the old schedules, but experiments are going on constantly to better the new schedules and make the finishing time still less. It seems that even durability will be sacrificed for the sake of speed, for it is now the mode to make beautiful things — and in large quantities so that they will sell for a price that will make them easy to move.

The former schedule of a large manufacturer of case goods, whose products were known for their fine finish, was as follows:

Sponge and sand and then stain —in the case of water stains— or, when using oil stains, merely stain. Dry overnight or as much as 24 hours. In the case of hard, almost non-porous wood, such as birch, no filler was used, whereas oak, mahogany, etc. were filled. Woods not filled were given two thin coats of shellac to fill the pores.

The filler or shellac, whichever the case may have been, was left overnight and then the first coat of varnish was applied. This coat was left to dry from 24 to 36 hours, and the second coat was applied. This coat dried from 2

Interior of modern drykiln in store fixture plant, used to hasten drying of all finishing materials

SEEING THROUGH

FOR the exacting clear lacquer job, the wise buyer standardizes on an undercoat of FLINT LACQUER SEALER . . . and M & L *Clear Finishing Lacquers:* ¶ For FLINT LACQUER SEALER alone brings out the *full* beauty of the grain. It cannot fog or cloud . . . has more solid body . . . builds better . . . goes further . . . and dries more quickly to sand. ¶ And M & L *Clear Finishing Lacquers* . . . whether the finish is rubbed or glossy . . . take full advantage of this perfected under surface. . . .

MAYER & LOEWENSTEIN
INDUSTRIAL FINISHING MATERIALS
43-43 VERNON BLVD., LONG ISLAND CITY
ESTABLISHED 1846

to 3 days and it was then rubbed with oil or water and pumice stone. On better work three coats of varnish were used. The surface was sanded between coats. The complete schedule took from six to ten days and was considered by some as not being long enough to allow the varnish to harden properly.

View of spray staining booth used to speed up staining operations

Through the use of lacquer the schedule was cut down to four days, and it was thought that great strides had been made. These strides were sufficient for a time but the maddening striving for more production soon caught up with the progress made, leading it a merry chase and, in slang vernacular, soon had it hanging on the ropes stalling for time.

You can't make a mule go faster by shoving him, and it was the same with finishing schedules; one couldn't rush them without suffering the consequence of bleeding stains and fillers, blooming and blushing of lacquer and all the other ailments so often bandied about. The solution was in the perfection of the materials and appliances entering into the finishing operations.

Stains were applied and quickly dried in heating ovens or kilns. Fillers were developed to dry in several hours, aided by the dry kilns. New lacquers were made in which most of the old troubles were removed and, with the aid of drykilns, these were dried in an incredibly short time. Quicker schedules made it necessary to improve the quality of the materials used to meet the strain imposed.

The case-goods manufacturer previously mentioned, had been keeping up with the times and was manufacturing two classes of goods. One was a quality line taking a rubbed finish; the other was a cheaper line taking a flat lacquer finish.

The schedule of the quality line was cut to an average of 1¾ days for a 9-hour day or 1½ days for a 13-hour day (or overtime day during rush periods). The schedule for the cheaper line was cut to an average 8-hour day.

Here is how this was done:

SCHEDULE FOR QUALITY LINE

Stain 7:40 A. M., fill 11:00 A. M., first coat 3:00 P. M., second coat 8:30 P. M. (for overtime day) or 7:40 A. M. next day (for regular day); third coat 7:40 A. M. next day for overtime schedule, or 11:00 A. M. for regular schedule; rubbing about 3½ hours after third coat.

SCHEDULE FOR CHEAPER LINE

Stain 7:40 A. M., fill 9:00 A. M., first coat 11:00 A. M., second coat 1:00 P. M., third coat 1:45 P. M., ready to trim 4:00 P. M.

Many will say the above schedules are impossible, but they are being adhered to daily; the finish is entirely satisfactory and the holding up qualities are normal.

It would indeed be false economy in this case to experiment on any but the very best of materials obtainable. With the right materials and proper care and supervision, much can be done towards producing quality finishes.

More Complete than Ever

WATSON'S
New Catalog of Painting Supplies

THE new 52nd edition of Watson's Catalog contains many new and improved items that make it larger and more complete than ever to better serve the needs of painters in every line of work.

Before ordering new supplies for your finishing shop, be sure to see Watson's new catalog. There is a surprise in store for you when you note the moderate prices we have quoted for highest quality merchandise. Send the coupon below for your copy.

For over 40 years the Geo. E. Watson Co. has been widely known as the "Old Reliable" source for painters' supplies and equipment. Our customers enthusiastically endorse our merchandise, prices, and service as witnessed by the following excerpts from their letters:

Wesson, Mississippi, customer writes: "I never bought any materials that better satisfied in every respect."

From Crawfordsville, Indiana, we hear: "As usual, I received my goods before I even got the acknowledgment of my order. You folks certainly put out the service."

Staten Island, New York, customer is strong for Watson's packaging: "The goods were shipped to me 'Like a grand piano in a Case of Gold'."

GEO. E. WATSON CO.

"The Paint People" **164 W. Lake St., Chicago, Illinois**

Mail This Coupon

Geo. E. Watson Co., "The Paint People"
164 W. Lake St., Chicago, Illinois
Please send me your new catalog on painting supplies.
Name_____
Firm_____
Street Address_____
City and State_____
IF4-Gray

Finishing Ultra-Violet Ray Therapy Lamps

By
P. C. HARBER

Superintendent of The Liebel-Flarsheim Co.* explains the metal cleaning and finishing operations leading up to and including the application of a black-gold finish on ultra-violet ray lamps, X-ray apparatus and other hospital equipment

THE VALUE of light therapy is recognized today. Tomorrow, still newer uses will be discovered for the ultra-violet ray. Our research and experimental departments have developed a lamp, the light of which matches sunlight in the Alps. It has been our job to develop the mechanical equipment—and the finish.

These lamps are used in physicians' offices, clinics, hospitals, and in the home, when on prescription and under supervision of a physician. The test to which these lamps are subjected is really severe, as far as the finish is concerned.

It was up to us to produce a finish for the outside of these lamps that would be durable, distinctive, smooth and attractive.

We experimented with solid white and black, clear lacquer finishes, monel metal, nickel and oxidized finishes. All of them fell short in one or more of the four points of our specifications. Then we developed the black-gold finish. By actual test of months of constant, hard use in hospitals and on salesmen's demonstrators, this finish has proved its durability.

Placed in the almost solid white setting of the hospital, this equipment stands out, different from all the rest. Having the appearance of a rough finish, it is smooth and easily cleaned. Finally it is pleasing to the eye; it is neat and gives a dignity to the equipment that would be impossible to obtain with a solid color.

The first of the finishing operations naturally consists of cleaning the metal surfaces. This is done in a gasoline wash which removes all grease and oil from the surface. Parts are then wiped by hand and blown off with air and go to the spray booth where a pyroxylin primer (red) is applied. After this primer is dry, the parts are inspected and any rough places are glazed with pyroxylin putty.

Following a brief drying period, a spray coat of pyroxylin surfacer (gray) is applied. This is allowed to air dry about five hours; then

*Physical therapy and X-ray apparatus, Cincinnati, Ohio.

Our Adaptation of The Newcomb Syphon Ventilated Cabinet For Use on Outside of Buildings

Particularly desirable where finishing-rooms are located on top floor, when stack is eliminated and weather-top only is used.

This installation for the outside placing does not alter the Newcomb principle of construction, but does release over 100 sq. ft. of finishing-room space for each cabinet and eliminates all fire risk in the finishing-room from spray cabinets.

Let Us Tell You About This Installation

Grand Rapids Blow Pipe and Dust Arrester Company

Dust Collecting Systems 527 Monroe Ave. Grand Rapids, Michigan

"SAY.... my bookkeeper can add!"

But he lost his job to an adding machine, anyway!

JABEZ FLINTROCK couldn't see that this new-fangled machine *was* an improvement. He refused to admit that extra expense sometimes really *pays*. And in the meantime, his longer-headed competitors used the innovation, widened operations, cut overhead costs, and forged ahead.

It happened with adding machines. It's happening today with FINISHES.

While many a business applies its good old finishes in the same old way, its competitors are experimenting with new and better finishes, which attract new buyers at no added cost, or which reduce costs and increase profits directly.

Egyptian Lacquer is cooperating daily with men who seek new and better materials—to cut costs and broaden markets. No matter what you make, if it requires a permanent finish, Egyptian Lacquer can help you. We either are all ready with a profit-making improvement for you, or we will put our vast research laboratories to work to develop an entirely new finish for *your* particular needs.

Call up the Egyptian Lacquer man in *your* city, today! *or* send the coupon.

THE EGYPTIAN LACQUER MFG. CO.
90 WEST STREET - NEW YORK CITY

Branches in charge of practical men *maintained in*

ATLANTA	CINCINNATI	KANSAS CITY	SAN FRANCISCO
BOSTON	CLEVELAND	LOS ANGELES	SEATTLE
BUFFALO	DALLAS	PHILADELPHIA	SPOKANE
CHICAGO	DETROIT	PORTLAND, ORE.	ST. LOUIS

The maker who is PROUD of What He Makes, Uses Egyptian Lacquer

EGYPTIAN LACQUER CO., 90 WEST ST., NEW YORK
It won't cost me anything to *find out* if you have anything I can use. Shoot!

Name.....

Address.....

When you buy lacquer ~~do you buy RESULTS?

After all, it's the resulting finish that's important when you buy lacquer. For a lacquer is good only in so far as the results of its application are good.

"No Tampering with Quality"

Our chief concern lies in producing better finishes for our clients. Their success—and ours—depends on it. Their continued patronage makes us believe we're doing a good job for them.

We think we can do the same for you. Won't you give us a chance to prove it?

The ROCKFORD VARNISH *Company*

ROCKFORD ILLINOIS

the parts are wet sanded, starting the operation with No. 320 sandpaper and finishing with No. 400 sandpaper. Then the parts are wiped clean and blown dry with air, after which they are moved to the spray booth for a coat of black semi-gloss lacquer. This coat is allowed to dry for about two hours and then parts go to the booth for a spray coat of black semi-gloss lacquer and turkey red bronze, applied in one operation.

Of course, the proportion of bronze powder used with the black lacquer determines the shade of the finish. After establishing this proportion, the dry bronze powder is stirred into the black lacquer in a large container and, when thoroughly mixed, it is poured into the quart container and attached to the spray gun.

Cleaning the lamp after assembly.

The bronze powder is held in suspension in the lacquer by means of an agitator in the quart container. This is imperative for uniform work, as the pigment in the lacquer is ground finer than the bronze powder, hence the latter will settle to the bottom of the container unless the mixture is agitated while being sprayed. When properly mixed and applied, the bronze powder is blended in the black, and uniformly distributed over the entire surface.

It is advisable to avoid mixing too great a quantity of this black and gold material at one time because, if it is allowed to stand in the container without being agitated, it will form a jelly that is not soluble in lacquer reducer.

After this final coat, the parts are allowed to dry about two hours, then they go to the assembly department. After assembly, the entire outer surface is cleaned with lacquer cleaner and the equipment is ready to be packed for shipment.

Business is excellent where costs are known and salesmen are aggressive.

Hercules Produces New Motion Picture

"The Story of Nitrocellulose" is the name of the latest motion picture produced by Hercules Powder Co., for general distribution. The film, three reels in length, depicts the sources, manufacture, and uses of nitrocellulose, the versatile product which is the basis of modern lacquer, celluloid, and pyroxylin materials.

Chemical and mechanical processes in the production of nitrocellulose are well illustrated by photographs and animated drawings. Chemical control to assure a uniform high quality is an important element in the manufacturing process.

The film was made for Hercules by The Pathescope Co. of America, and is available in standard or small size film by application to the Visual Education Department, Hercules Powder Co., Wilmington, Delaware.

Finishing Bobby Hair Pins in Lacquer

By
C. STAKER

How the problem of finishing miladies' bobby pins attractively, economically and on a production basis was solved through the use of suitable hairpin holders, metal cleaning equipment, spray finishing and colored lacquer enamel

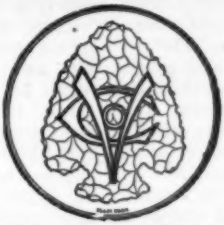
BOBBED HAIR has presented an outlet to the protective coating field in the finishing of bobbed hairpins (bobby pins). When this new industry was first presented, the method of procedure toward coating was considered quite a problem, but the problem has been solved recently. Among the many methods of procedure first considered, there were the possibilities of coating by the dipping method, as well as the thought of tumbling, but these have given way to coating by spray application. Going through the stages of manufacture and realizing the uses to which these finished articles are subjected, the problem can be well appreciated from its every angle, as well as consideration given the cost and selling price of the finished article.

The pins are made of ⅛-in. steel bands which are received in rolls of 250-ft. lengths. These rolls are placed on a turntable beside the machine used in forming the pins. The end of the steel is inserted into the machine and the pin is bent double. One side of the pin remains straight, while the other side has a wavy appearance near the open end. A crook about ⅛-in. in diameter remains at the point of bend, while below this crook the pin is tightly drawn together.

The machine will turn out about 50,000 pins a day. It is estimated that 100,000,000 pins were manufactured in 1929. As one pin is formed it is forced by the succeeding pin onto a 1/16-in. piece of wire, which is dropped at a 45° angle. An operator at this point runs the formed pins onto a narrow piece of metal about 2-ft. in length and about 2-in. in width. These pins are placed on the metal strips by hand. A very flexible wire is inserted into each strip for the purpose of hanging in the spray booth. These strips will hold between 250 and 300 pins.

After these narrow strips of metal are filled, they are taken to the spray room where they are given an immersion and cleaning of lacquer solvent cleaner to insure absolute freedom from grease and all foreign material. The pins are then given a light blast of dry air, and hung up in the booth.

Two predominating colors are used—brown and black. These lacquer enamels are somewhat flexible in nature, solid-covering and rather fast-drying in view of their flexible nature. Gravity feed types of spray guns are employed and a solid covering of enamel



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Repeat orders from customers in constantly increasing volume is real proof of our ever growing service to the industrial world. Many of our customers have been on our books for over 25 years.

Half a century of practical experience — of development — of anticipating needs has put us in a position to furnish quality finishing materials at a money saving cost.

We specialize in Clear, Rubbed-Effect and Colored Lacquers:

Also in Paragon Rubbed-Effect Varnishes: Flat, Velvet, and Semi-Bright.

Our corps of long experienced specialists are always ready to assist you in obtaining the most satisfactory results at a low unit cost.

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is produced in one application. After these pins are sprayed, they are placed on racks and force-dried for 30 minutes at 110° F.

One of the desirable and essential features of the enamel is that, in the assembly operation, the enamel must not have the affinity to stick the pins together; each pin must break even and free of the succeeding pin. The enamel must be of an eggshell sheen to harmonize with the human hair. After the force drying, the pins are taken to the assembly room, where each pin is handled individually and placed on cardboards. They are then packed and shipped.

Paint Specifications Do Protect the Buyer

(Continued from page 20)

finishes, as determined by outside and inside weathering tests.

While some of these tests can be specific, some must necessarily be relative, that is, comparable to a standard sample. This standard sample should be taken and kept by the buyer, and a portion of the same should be returned to the manufacturer to be retained by him. In the testing of shipments, comparison should be made to this standard and the results tabulated in the form of a permanent record.

Writing the Specifications

When the user knows what his actual requirements are in the way of physical properties, the writing of the specification should be undertaken. When writing a specification for material already being used, it is easy to get data as to how much variance should be allowed, but when the user desires a product he has never used before, a different procedure must be followed. He should advise the different manufacturers he deals with as to the finish he desires, invite them to submit samples to him and try out these samples under his actual operating conditions. In this way he can determine which type is most feasible for his purpose, considering of course the cost of material, cost of application, decorative effect and ultimate protection of the product.

If he adopts the product, he can draw the specification for this material in relation to the sample submitted. Thus he does not specify an impossible product nor one at an excessive price.

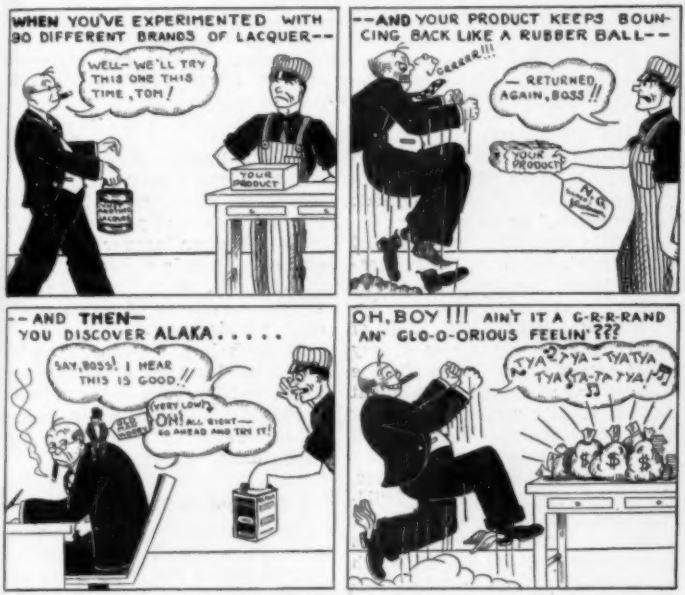
The manufacturer and user are both protected when buying on specifications describing the physical properties, as there is then no doubt as to what the buyer wants when he places an order. The buyer gives the manufacturer an idea of what he expects the material to do and sets out his needs in a definite manner.

Check Each Shipment

To obtain the realistic effect of such specification buying and a guarantee against protection troubles because of the failure of materials, the buyer must check each shipment received on such orders. Failure to meet the requirements means rejection and return of the material to the manufacturer. As stated above, this testing can be done by an experienced finisher and at a low cost, so why should any user buy and use material blindfolded?

Buying on such specifications enables the buyer to safeguard and standardize the quality of the material he uses, which in turn directly affects his finished product and the sale thereof.

When You've Experimented with 90 Different Brands of Lacquer


WHEN YOU'VE EXPERIMENTED WITH 90 DIFFERENT BRANDS OF LACQUER--
WELL- WE'LL TRY THIS ONE THIS TIME, TOM!
YOUR PRODUCT
--AND YOUR PRODUCT KEEPS BOUNCING BACK LIKE A RUBBER BALL--
— RETURNED AGAIN, BOSS!!
YOUR PRODUCT
N.G.
--AND THEN— YOU DISCOVER ALAKA.....
SAY, BOSS! I HEAR THIS IS GOOD!!
(VERY LOW) OH! ALL RIGHT— GO AHEAD AND TRY IT!
OH, BOY!!! AIN'T IT A G-R-R-RAND AN' GLO-O-ORIOUS FEELIN'???
TYA-TYA-TYA TYA-TYA-TYA

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In Automotive Finishing

Quick-Drying Primers and Surfacers Coming

By
W. F. ARDUSSI

Michigan Representative of Chas. R. Long, Jr. Co.* calls attention to "The Neck of the Bottle" in Automobile production and declares that for this reason, quick-drying primers and surfacers will be further developed and widely used by the automotive industry

IN THE automobile industry, the body finishing plants have always been and still are the "neck of the bottle," so to speak.

Back in the old days of enamel and varnish finishing, the tremendous storage requirements necessary for the drying of bodies between coats, limited the output of the body manufacturer to a very great extent. Then nitrocellulose lacquer was perfected and brought with it greatly diminished drying time, big increases in production and consequent savings.

In spite of the use of lacquers, several floors in immense buildings are still devoted to drying ovens for baking long-oil primers and surfacers. And, although automobile manufacturers can assemble motors and chassis in almost limitless numbers, lack of corresponding numbers of bodies still holds up production.

What is the answer to this problem? Lacquer manufacturers are already answering with quick-drying primers and surfacers. Of course, these materials have not yet been perfected to the extent where they can be universally adopted. But the time when they will be adopted is not far off.

Both success and failure has marked the use of products of this type. As when lacquer first came out, some people swore by it and others at it, so finishers are taking their swearing sides on quick-drying undercoats.

Nevertheless, the fact remains that a few body manufacturers are using quick-drying primers with apparent success, while some others are using both quick drying-primers and surfacers.

Automobile Metal Primers

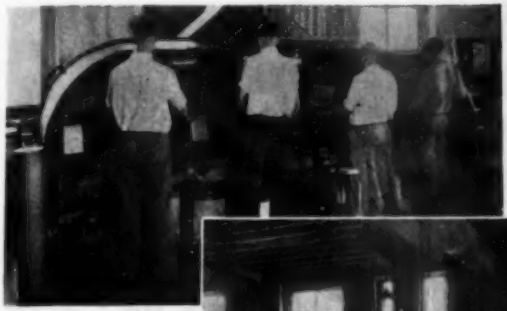
Too much attention cannot be given to primers. They are the foundation of the coats that are to follow, and many a poor lacquer job can be directly traced to primer trouble. Of course, it is above all necessary that the body metal be entirely clean and free from oil and rust. Various rust removers and inhibitors, now on the market, accomplish this purpose.

A satisfactory primer must have the ultimate in adhesiveness to metal. It should be hard but not brittle; flexible but not soft.

(Continued on page 76)

*Mfr. Paints, Varnishes & Lacquers, Louisville, Ky.

KIRK & BLUM Industrial Finishing Equipment in Kodel Mfg. Co. Plant



Spray booth and pickling tank in the Kodel Electric & Mfg. Co. plant, furnished by Kirk & Blum Mfg. Co.

Speeds Production

An interesting and very efficient method of industrial finishing is employed by the Kodel Elec. & Mfg. Co. of Cincinnati. Planned and installed by Kirk & Blum Engineers, specially constructed spray booths and pickling tanks, now speed up the entire process of finishing metal parts, producing vastly improved finishing surfaces.

Typical Kirk & Blum equipment for the application and drying of finishing materials on a production basis, covers booths, ovens, conveyors and ventilators - industrial finishing systems adapted specifically to furniture, automotive and other industries; we also design and install special booths and handling equipment.

Experienced engineers and ample facilities for rendering prompt service. Submit your industrial finishing equipment problems to us!

THE KIRK & BLUM MFG. CO., 2890 Spring Grove Ave., Cincinnati, Ohio
Detroit Factory and Office: 4718 Burlingame

Pittsburgh Representative: The Bushnell Mchy. Co., 1501 Grant Bldg.
Louisville Representative: Liberty Blow Pipe Co., Inc., 917 S. 12th St.
Canadian Representative: Canadian-Rogers Ltd., Winnipeg and Toronto

KIRK & BLUM

Industrial Finishing Equipment

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LILLY Varnish
With the Right

All Take off Their Hats *to Quality*

Quality always commands respect, whether it be quality folks or quality products. Customers and competitors have always taken off their hats to the quality in Lilly Varnishes, Lacquers and Enamels. That quality begins today — as it has always begun — with quality in the materials used. Before it can be accepted for use in the manufacture of any Lilly product, every basic ingredient must pass rigid laboratory tests and meet definite and absolute standards of chemical formation and performance.

Back of every formula is a record of laboratory research and development to meet most perfectly the particular requirements involved. In manufacturing, every detail of every formula in materials and blending is rigidly observed, and every mix of every product is carefully checked against approved samples kept on file. We establish quality and absolutely maintain it.

The service from our technical staff and from our sales and manufacturing organization is of the same uniformly high quality that marks the product itself.

Whatever your problem in varnishes, lacquers or enamels, write us about it and let us develop a Lilly *quality* formula to meet your special requirements. Lilly Varnish Company, 666 South California Street, Indianapolis, Indiana.

The quality of Lilly Varnishes, Lacquers and Enamels is universally recognized and respected in the industrial finishing field.

sh Lacquer-Enamel

ght Finish, You'll Finish Right

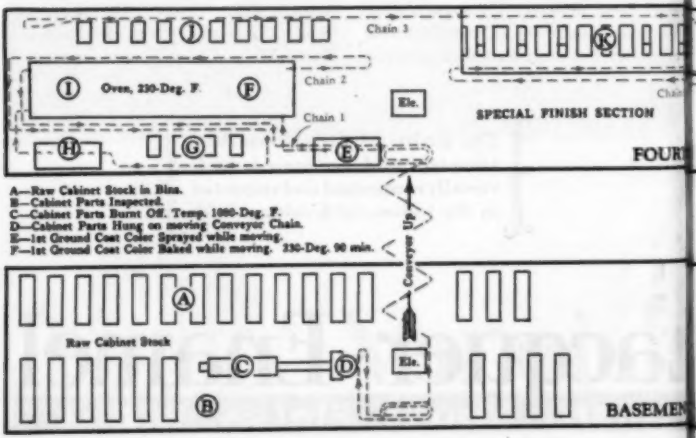
National Cash Register's Finishing Process

By
E. E. HUMMERICH
Foreman Finisher
At The N. C. R. Co.

OUR FINISHING department is confined to the basement and the fourth floor of a building 60x540-ft. The basement contains the raw and finished cabinet stock, metal cleaning and finished-parts wrapping stations. All of the finishing is done on the fourth floor which contains five overhead conveyor chains totaling 6,494-ft. Parts are removed from these chains for only four operations in the entire finishing process.

We use the raw-cabinet-stock system, consisting of a series of bins located in the basement, shown at *A* in the layout plan, to which cabinet parts are brought from the stamping department. From this stock a given number of parts are taken each day to complete that day's production of completely finished cabinets. As approximately one hour is required for parts to pass from point *B*, in the basement, through point *E* on the fourth floor, the basement crew starts to work one hour earlier in the morning and stops one hour earlier in the afternoon than the finishing department. In this manner the department is cleared each day, promoting regularity and making for a definite gauge on production.

Unfinished parts are inspected

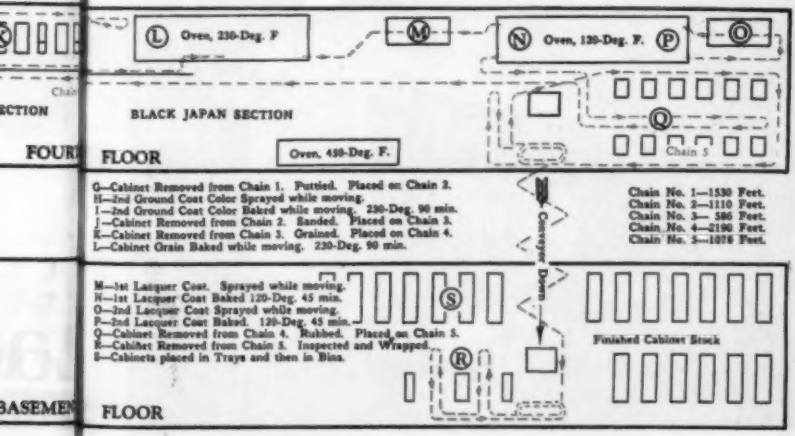


"The installation of our present system has reduced the number of handlings of parts from 58 to 20, cut down production time per cabinet, (finishing) from 7½ to 1½ days, eliminated 475 steel trucks and 6,650 trays, and based on a 9-hr. day, it has increased production of completely finished cabinets from 600 to 890 per day"

at *B* and placed on a conveyor which carries them into the oven *C*, where they are exposed to 1200°F. for 8 minutes. This removes all grease and oil and, since there is no rust on these steel stampings, this is the only metal cleaning necessary. Parts leaving the oven pass through a cooling tunnel and at point *D* they are removed from this conveyor, brushed by hand to remove dust or foreign particles, and hung on the conveyor chain which delivers them to the fourth floor.

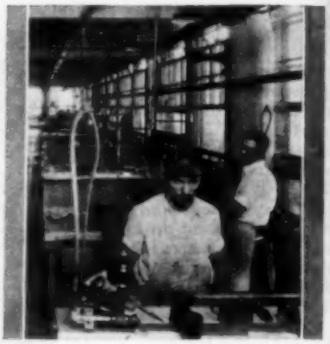
Parts automatically pass onto conveyor No. 1 and travel through the conveyorized spray booth *E* where a coat of oil primer is applied as the parts are carried forward on the chain at the rate of

Below: Floor plans of the basement and fourth floors, each 60 x 540-ft., wherein the five chain conveyors appear in red.


L Oven, 230-Deg. F
M
N Oven, 120-Deg. F.
P
O
BLACK JAPAN SECTION
Q
Chain 5
FLOOR
Oven, 430-Deg. F.
G—Cabinet Removed from Chain 1. Putties. Placed on Chain 2.
H—2nd Ground Coat Color Sprayed while moving.
I—2nd Ground Coat Color Baked while moving. 230-Deg. 90 min.
J—Cabinet Removed from Chain 2. Sanded. Placed on Chain 3.
K—Cabinet Removed from Chain 3. Grained. Placed on Chain 4.
L—Cabinet Grain Baked while moving. 230-Deg. 90 min.
Conveyor Down
Chain No. 1—1530 Feet.
Chain No. 2—1110 Feet.
Chain No. 3— 586 Feet.
Chain No. 4—2190 Feet.
Chain No. 5—1078 Feet.
M—1st Lacquer Coat. Sprayed while moving.
N—1st Lacquer Coat Baked 120-Deg. 45 min.
O—2nd Lacquer Coat Sprayed while moving.
P—2nd Lacquer Coat Baked. 120-Deg. 45 min.
Q—Cabinet Removed from Chain 4. Rubbed. Placed on Chain 5.
R—Cabinet Removed from Chain 5. Inspected and Wrapped.
S—Cabinets placed in Trays and then in Bins.
S
R
Finished Cabinet Stock
FLOOR

7½-ft. per minute. After being sprayed, the parts enter the upper compartment of oven *IF* where the prime coat is baked for 90 minutes at 225°F. It will be remembered that the parts are still suspended from Chain 1, traveling at the same rate of speed inside oven *IF*. The 90 minutes baking period is gained by rotating parts in the oven.

Leaving this oven, the parts are removed from Chain 1, at point *G*, where they are inspected and where any rough places are putty glazed. While this operation bears the same name and is similar in method and purpose as that employed in automobile-body finishing, it must be borne in mind that we are handling a different grade of sheet steel and a much smaller surface area.



At the sanding tables where cabinet parts are sanded, then cleaned, before going to the graining room. See station J on floor plan.

A special putty is used and is not baked nor sanded before the application of the ground coat. This oil-base ground

Below: One of the conveyorized spray booths where cabinet parts are sprayed with clear gloss lacquer as they are carried forward on Chain 4 at the rate of 7½-ft. per minute. Filtered air is delivered to these spray rooms at the rate of 120 changes per hour, thus eliminating all fumes and preventing unclean work. See station O on floor plan.

Fifteen of the world's largest manufacturers in various lines of industry have adopted the Oxvar Process exclusively for the reproduction of wood grain and marble.
Nationally known products marketed by these companies represent the ultimate in finishing, beautifying the world's largest buildings and adorning the country's finest homes.
Details furnished upon request.
OXFORD
Varnish Corporation
Detroit, Michigan
Processes patented in the U. S. and foreign countries

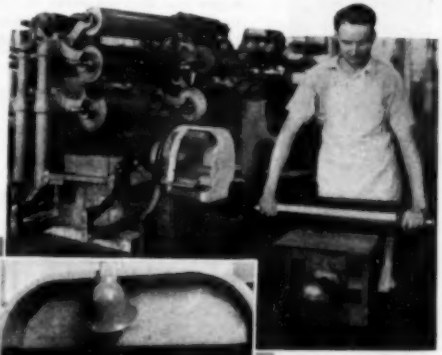
coat is sprayed on as the parts travel through the conveyorized booth *H*, suspended from Chain 2. This chain travels through the lower compartment of oven *IF*. It is possible for us to use the two-compartment oven, because the ground coat is baked for the same length of time and at the same temperature as the prime coat.

As parts leave the oven they are removed from Chain 2 at *J* where they are sanded with No. 150 sandpaper.

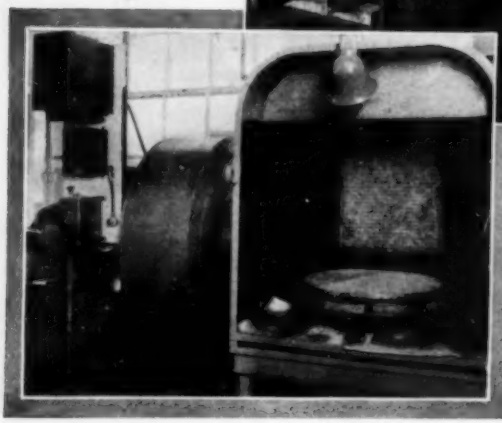
A tack-rag operation follows; then the pieces are blown clean with air and placed on Chain 3 for delivery to graining room *K*.

I consider the graining operation one of the most, if not actually the most important of our finishing operations. It is one on which we have done a great deal of studying and experimental work. The process is known as the copper-plate, rubber-roll method, whereby the wood grain is transferred from a copper plate by means of soft rubber rolls.

There is nothing new about this method, but our studying and experimental work has been devoted to the rubber and composition rolls by which the grain is transferred, and to methods of handling parts to be grained, and equipment to facilitate the cleaning and drying of these rolls after each



Below: One of the individual spray booths showing filter screen in back. All of the booths, including the large conveyorized booths in this plant, are equipped with screens over the exhaust fan. These screens are removed when the excelsior filler becomes saturated with lacquer—generally at the end of a 9-hour day—and taken to the lacquer room where they are placed in a water tank or washed off with a hose. Then the screens are repacked with clean dry excelsior and replaced in the spray booths.



Above: Transferring wood grain onto cabinet. Notice the rolls on rack above bench, the different sizes, how they are cut out and the varying colors. Notice the convenient height of the frame holder in use. This speeds up the operation, avoids fatiguing the operator, and makes for greater production. Refer to K on floor plan.

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Metallic Grave Vaults
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PAINTS

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The Ferbert-Schorndorfer Co.
Cleveland, Ohio

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application of the figure design on each part. In other words, we obtain the same high quality of graining on a production basis that, under ordinary conditions, would be possible only by slow painstaking methods.

Much of the success of the graining operation lies in the roll, while rate of production, of course, depends on the equipment. Cash register parts are of different shapes and sizes. Some of them have various size openings in the surface to be grained. The surface of our rolls are cut out to coincide with the opening in the metal surface and, by experimentation, we have determined the proper flexibility of the rolls adapted to the various parts.

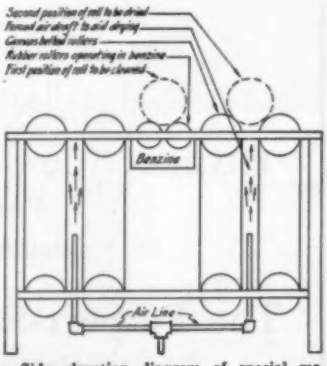
Rubbing the finished surface with pumice and water—using a portable rubbing machine. See station Q on floor plan.

Some of these rolls are made of soft rubber; others are made of a composition material—the consistence of each being controlled by the part on which the particular roll is to be used. In further explanation of this specific point, it has been our aim to produce a roll by which the wood grain may be transferred to the metal surface irrespective of the contour of the metal surface, with a minimum of subsequent hand blending or touching up, and still maintain the very high class graining work demanded in a product like ours.

Next in importance, so far as production is concerned, is the speed with which it is possible to clean and dry the rolls after each application of the wood figure. We have developed a roller washing and drying machine which may be operated from two sides. All of the rollers on this machine are power driven and operate continuously during the graining operation.

The roll-cleaning process follows: After the operator has finished transferring the wood grain to the metal surface, he places the roll between the rubber rollers revolving in benzine. This cleans the roll. Then the roll is placed between the canvas-belted rollers by means of which, with the aid of a forced draft of air between these rollers, the roll is quickly dried. This machine is very efficient.

After the graining operation, cash register parts are placed on


Second position of roll to be dried
Forced air draft to aid drying
Canvas belted rollers
Rubber rollers operating in benzine
First position of roll to be cleaned
Benzine
Air Line

Side elevation diagram of special machine for washing and drying graining rollers to keep them in condition.

BETTER DISTRIBUTION of HEAT

1. Absolute Control.
2. Speedier Processing.
3. More Even Distribution of Heat.
4. Better Circulation of Air.
5. More Uniform Output.
6. Increased Production.
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HIGH TEMPERATURE

OIL or GAS FIRED **Heaters**

Only a strictly uniform temperature in every part of the industrial oven or dryer can possibly assure unformity in the finished product. The Nichols-McCann-Harrison Heater features forced air circulation which delivers the heated air through distributing ducts inside the oven or dryer and then recirculates this air. Positive insurance against local overheating or underheating is the important advantage gained from this even distribution of heat. Drying and baking operations are not only speedier but finishes are more uniform and more durable.

We maintain a laboratory where you may test this high temperature method on your own product. This service is available without obligation. Write for particulars.

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High Temperature Drying and Processing — Industrial Ovens Conveyors — Spray Booths, Air Washers Dip Tanks

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NEW YORK CLEVELAND CHICAGO PORTLAND, ORE.

Chain 4 to enter oven *L* where the grain coat is baked for 90 minutes at 220°F. Parts leaving this oven are tack-ragged to remove all foreign particles and nibs; then they enter booth *M* where a coat of clear gloss lacquer is sprayed

Operators remove completely-finished cabinet parts from the chain, and then inspect and wrap them in flannel cloth. The parts are then placed in numbered trays and moved to finished-cabinet stock storage, from which they are requisitioned for assembly. Refer to areas R and S in the floor plan layout.

on. This coat is dried in the upper compartment of oven *NP* for 45 minutes at 110°F. Remaining on Chain 4, the parts enter booth *O* for a second coat of clear gloss lacquer and then, enter the lower compartment oven *NP* (which is a two-compartment oven similar to *IF*) to be dried for the same length of time and at the same temperature as the first lacquer coat.

After this drying operation, the parts are removed from Chain 4 at *Q*, where they are rubbed with pumice and water. Cabinet parts are then polished with oil and placed on Chain 5, which passes by the station where "Decal." names are applied. This is a special decalcomania and requires no after coats for protection.

The particular parts requiring the application of a name are then replaced on Chain 5, which delivers all of the parts to the basement of the building. At station *R*, they are removed from the chain, inspected and wrapped in light flannel cloth to protect the finish. Wrapped parts are then placed in the proper bins in the finished cabinet stock *S*. Requisitions for parts to make a complete cash register cabinet are drawn on this stock.

Quick-Drying Primers and Surfacers Coming

(Continued from page 64)

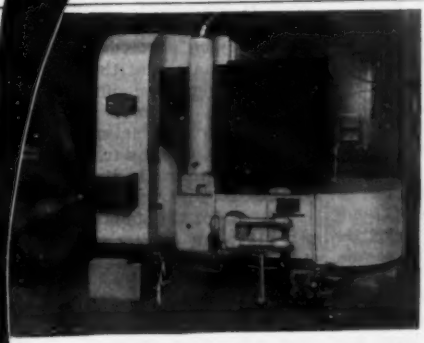
It might seem that these qualities are ideals that we strive to attain, but in many senses of the word they are and have to be practical actualities.

If primer lacks proper adhesiveness, it will not stick to the metal, and any succeeding coats of surfacer and lacquer will peel off. A soft primer cannot form a good base for surfacers or lacquers because it will crawl when pressure is applied through hand or machine sanding and polishing. Brittleness will encourage flaking and any sharp blow on the lacquered surface will cause a finish having this defect to crack off. Flexibility is a main requisite in primer if the finish is to survive the many minor bumps and dents that a car undergoes in this automobile age where collisions are commonplace.

It is quite easy to see where even slight variations in the quality of material can cause endless trouble.

One must be quite audacious to champion the cause of quick-

DRY-SYS OVENS AND HEATERS FOR ANY PRODUCTION SCHEDULE



Illustrating a DRY-SYS Compact Heater installed alongside a six-foot oven. Capacity ranges from 200,000 to 350,000 B. T. U.

DRY-SYS ovens and heating equipment have, for years, been the acme of efficient design and operation on large production schedules.

Convected heat, re-circulation of air and automatic control have always been fundamental principles of DRY-SYS heating.

NOW—for the first time—DRY-SYS ovens and heaters are available to plants having small production drying and baking.

New developments in heating design brings the DRY-SYS Compact Heater—gas fired, induced draft—small enough to set on top or alongside a six-foot oven without crowding.

The new equipment is backed by all the engineering ability and experience that has made possible the phenomenal success of DRY-SYS ovens and heaters in their many unusual installations.

It is a guarantee to the small production plant of maximum oven efficiency at a price they can afford to pay.

PATENT PROTECTION

DRY-SYS Induced Draft Heaters and DRY-SYS Multiduke Alternate Heaters are covered by patents and patent applications on specific design or process features. Drying Systems, Inc., are the sole licensees of U. S. Patent No. 1707141, granted Henry L. Doherty, April 17, 1917 on application filed July 6, 1915, covering the recirculation of diluted products of combustion, in drying and baking processes.

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drying materials in the face of all of these difficulties.

Heretofore, the main difficulty with quick-drying primers has been lack of good adhesion. It seems that the increased rapidity in drying did not permit proper penetration of the primer into the pores of the metal. This, coupled with the fact that lacquer-base primers would not absorb or combine with any oils remaining on the metallic surface after cleaning, caused lacquer-base primers to come into bad repute—in many instances through no inherent fault of their own.

Whenever a finishing material dries with any great amount of rapidity, an accompanying tendency to flake and become brittle is often apparent. This, also, was a difficulty experienced with the original lacquer primers. Additions of materials to counteract this tendency have, to a large degree, eliminated this evil.

In spite of the apparent advantages of quick-drying primer, there still exists considerable prejudice as a result of this earlier product, and much missionary work must now be done to reconvert users who have had difficulty with the original material.

Automotive Surfacers

The problem of surfacers, although complicated, is in many respects simpler than that of primers. First of all, surfacers must, as the name implies, fill out the valleys and small indentations of the body steel and present a smooth surface for the application of lacquer.

Contrary to the results obtained with varnish, lacquer has the quality of emphasizing and exaggerating the unevenness of a panel. It is, therefore, absolutely essential that after sanding, the finish on a body panel be perfectly smooth. To accomplish this, a heavy layer of surfacer is sprayed over the body. The excess is then sanded off smoothly.

Surfacer then must be a material that will sand readily. It must have a fairly high degree of cohesion in itself, and must not gum up sandpaper. These are the qualities that the manufacturer of quick drying surfaces strives for.

It is certain that the day of 90-minute oven-dried undercoats is about over. If, for a moment, we look at the possible savings, it is easy to see why the trend is in the direction of rapid-drying undercoats.

Let us, for the moment, imagine a body plant having an output of 1,000 bodies per day. Through the use of more rapid-drying finishes, this plant can cut its drying time, say 40%. This will give it an output of 1 2/3 of the former production, or 66 2/3% more than it formerly had. To put it another way, the same production could be realized, through the use of quick-drying materials, with a plant 60% the size of the original one. Now if we consider the enormous savings made possible in this manner and by the additional reduction of overhead and speeding up of the finishing process, the importance of this problem is at once realized.

The "neck of the bottle" is now expanding and it will not be long before we have a "wide-mouthed bottle" and an additional appreciable saving made in the cost of the United States' third largest industry—automobile manufacturing.

The executive who appreciates the sales power of an excellent finish is eager to learn of the latest developments in this field.

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Metal products designed for outdoor use become vastly more serviceable and therefore find far greater sales when protected against every form of weather exposure by the new Zellac Outdoor Exposure Grades of lacquer. . . . These efficient clear and pigmented grades are supplied for either spray or dip speed application, and provide you with the usual Zellac qualities—a wide range of attractive colors, extreme durability, washability, ease of application, economy—plus their amazing weather-resisting stamina—at no extra cost! A beauty and utility is added to metal products finished with Zellac Outdoor Exposure Grades which remains indefinitely, even when subjected to severest extremes of sunlight and temperature changes. These grades are made in standardized form, or can be supplied to specially-developed formulas to meet any customer's requirements. Full particulars on request.

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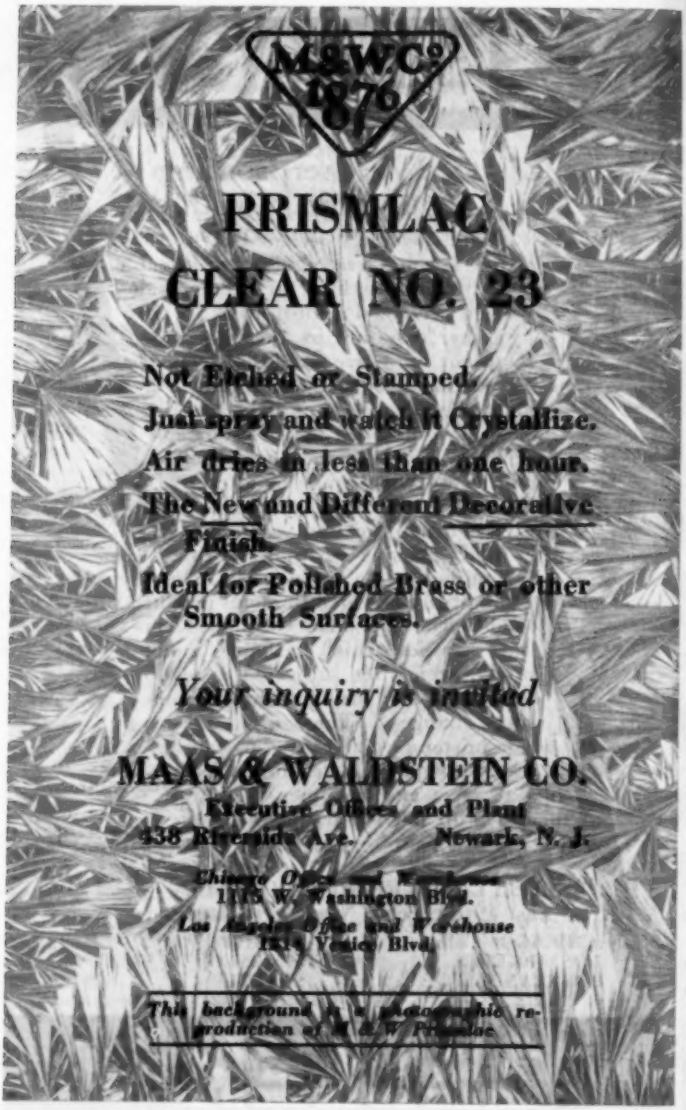
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Questions and Answers

This service department is conducted to meet the reader's need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

Ground Coat for Graining on Metal

I would like to get some information on imitation mahogany grain on all kinds of metals. (1) Should I use a flat ground color? The ground color I use now is red and has a gloss. (2) What kind of brushes should I use? I can't use graining tools on this kind of work. Where can I get these brushes? (3) The stain I use comes in paste form and I thin it with turpentine to the desired shade.

The trouble I have is that the stain seems to crawl after I grain it and I have to go over it several times, which takes up a lot of time. Also, tell me how to use my brushes to get the grain as close to real mahogany as possible. The reason we want our finish like our competitors' is that we refinish a lot of equipment, as well as manufacture new goods, and these articles have to match the other fixtures in the dental offices.—A. S.

In my opinion the gloss ground color is the cause of the stain crawling. By all means you should use a dead-flat ground coat. Blenders' check rollers and various kinds of graining tools can be purchased from a well known supply firm that advertises in INDUSTRIAL FINISHING. It is rather difficult to explain the use of these tools without knowing the kind of mahogany grain you wish to reproduce. There are several books on graining* and I would advise you to secure one or two of these for specific information on how to reproduce the various wood grains.—J. K. Cooper.

As long as you use graining stain over a glossy ground color, your graining color will crawl. In the first place you haven't any foundation for your graining work to stain the blending, but I suggest that you flatten your ground color and fix your stain pretty heavy and, instead of using tools, try to use a cotton rag on your finger tips to imitate mahogany graining, and blend it with a badger-hair blender.

Another way to imitate mahogany is to stipple your work with water color before applying an oil stain. With this method you will be able to get a more natural mahogany.

I suggest using a 2-in. flat fitch brush for applying the stain, and a few small mottlers (mottling brushes) 2-in. wide, for the veining lines. These are the only brushes needed for the imitation of ma-

---

*Names on request.

hogany graining. These graining tools can be had from almost any finishers' supply house.—George Moskos.

Finishing Metal Dials

Supplementing the answer to the question under the above title in March issue, page 81, in which a finishing process was described for small metal dials so that more economical production could be obtained, I suggest the following:

These dials may be tumble coated, but my experience with two coat tumbling is that it hasn't

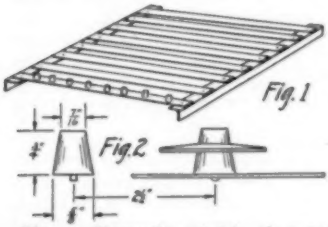

Fig. 1—Perspective sketch of metal rack with round tapered plugs in place on only one of the eight cross bars.

Fig. 2—Details of two round tapered plugs, one of which is supporting a dial plate of the size specified.

turned out as satisfactory as spraying. Since the C. Mfg. Co. seems to be satisfied with the present finish, because it stands up under the 100-hour salt spray test, I believe that my method of spraying will do the work with a saving in time of almost 50%.

I suggest that metal racks be made and fitted with taper plugs, as shown in Fig. 1, the plugs to be spaced about 2½-in. apart on centers both ways, as shown in the enlarged detail marked "Fig. 2." Such a frame, about 19x19-in. will hold 64 dials.

First, I would begin by placing cleaned dials on wire screens —placing the dials with their backs or concave sides up—and spray them. Then I would transfer them to the metal rack, cautioning the workman to touch only the extreme edges with thumb and fingers. Now, with the dials dropped over the plugs, sprayed side down, the tops or face sides of the dials can be sprayed. The first coat (both sides) is then baked after sliding the rackful of dials into the oven. Repeat these operations for the second coat, and the job is completed.

If any marks are made by fingers in transferring dials from screen to rack, these will be hidden by the top spray coat.—H. Smallwood.

EDITOR'S NOTE: Instead of making and using round tapered plugs to support the dials, it is sug-

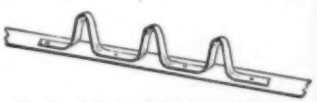

Fig. 3.—Suggested bent metal strips for supporting dials being sprayed

gested that metal strips be bent and attached to the rack as shown in Fig. 3. The hole in each dial would make only a four-point contact with these supports, whereas on a round tapered plug, it would be in contact all around the edge of the hole.

Walnut Grain on Metal Radiator Covers

Several months ago we started to make radiator covers. These are hand grained. The company doesn't want mechanical work—it must be all hand graining. I am experienced in hand graining, but what bothers me on this job is to reproduce the little specks

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WE want you to make a test at our expense, Mr. Chemist! With your permission, we want to send you a free sample of Butanol—the versatile alcohol. Butanol has contributed to the improvement of scores of existing processes.

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representing filled walnut pores. I have a check roller, but the grain isn't natural enough. I can use water or oil graining colors.—J. J P.

My suggestion is to mix your graining color with naphtha and use with your check roller, which should be fitted with a brush attachment. Don't overload your brush with very much color at a time. Try to load the back end of your brush so as to avoid running too much color onto your check roller at a time. The color you use on your brush must be stiff enough to produce the fine pore effect as in the walnut.

Another way of obtaining fine pores is by using a stippler brush or over-grainer.—George Moskos.

Golf Tees Tumble-Finished

I am mailing you two samples of golf tees; one you will note has a nice smooth gloss finish, while the other has a thin flat finish that shows the wood grain. Can you tell me how to tumble on this gloss finish?

The lacquer on both tees is tumbled on, but we are unable to get the gloss finish. Would greatly appreciate any information that can be given or recommended.—G. F. A.

I feel sure that the difference comes in the difference of material used on the two tees. On the yellow tee, which appears dull in comparison to the red one, it is apparent that a rather thin material has been used—just barely enough to color it—whereas on the other tee, the finish has not only given the wood color, but has filled the surface of the wood and presents some thickness of coating which has evidently been smoothed up, of course, by continued tumbling. We don't believe any manufacturer could afford to give this two tumble-finish coats, although it is possible that the tees were tumbled twice—once to coat them to apply the finish, and a second time to polish the finish after it has partially or completely dried.

It is also possible that this finish may have been applied by a dipping process—that is by submerging a wire basket full of these tees in a vat of heavy-bodied lacquer enamel, and then whirling or agitating the basket to get the finish properly distributed over all of the tees; then placing the basket of freshly finished tees somewhere to dry and finally tumbling them in the tumbling barrel with sawdust or shavings to remove the marks where any were stuck together, or where any of the finish may have been a little heavy.—W. H. R.

Solid Enamel on Fir

An old question has bobbed up again in March issue, page 86, under the title, "Solid Enamel on Fir." Fir wood has an alternate hard and soft grain—the dark part being very hard and the light part very soft, so any one trying to coat this wood without proper preparation is courting trouble. The enamel will surely soak into the soft parts of the wood more than into the hard grain. Of course, the paint soaking into the softwood makes the grain raise, and it must be sanded smooth, or a rough finish will result.

The inquirer, in his question, doesn't say whether he is using

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Asked to tackle this problem, our engineers offered a new and less expensive thinner for use with the regular lacquer. The drying problem was solved at once, without change in the quality of the finish. Yet the manufacturer showed an average saving of $6,000 per year on material cost alone!

Surprising? But this is *only one of the many* case records where Pierce & Stevens, Inc., has pointed the way to production economy. Others are equally spectacular.

We will gladly submit evidence as to what we have accomplished for others in the way of thinner formulation. And if you will tell us something of the working conditions in your plant and the methods of application, we'll submit samples and quotations.

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Industrial Lacquers and Thinners

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lacquer or oil enamel, but with either one you must start the finish properly. I suggest a first coat of wood sealer or shellac; then a sanding followed by a coat of oil-base primer of whatever color the following enamel coat will be. This primer coat may need a light sanding before you apply the enamel. To attempt to get a finish on fir with one coat of enamel, even if applied over a coat of shellac, is a waste of time and money, and an unsatisfactory finish is the usual outcome.—J. K. Cooper.

Lacquer Finish Cracked

What are the causes of cracked lacquer? We use a very good lacquer; as a sealer we use shellac, or lacquer sealer, and an oil filler. Eight hours drying time is allowed between coats, before rubbing. Does cold weather have anything to do with this condition?—U. C. & C. Co.

"Cracked Lacquer" may be caused by an insufficiently dried oil filler in combination with too heavy an intermediate coat of shellac. If shellac must be used, the thinner it is used the better—and always sand the shellac surface before applying the lacquer coats.

When lacquer sanding sealer is used, care should be exercised in selecting a real quality grade material. For first class work, an extra coat or two of lacquer is, to my mind, preferable to the coat of lacquer sanding sealer.

Cold weather will slow up the drying of an oil filler and, under these circumstances, may be a contributing factor to the trouble complained of. Lacquer will not be so affected, although it is very desirable to have materials used, the surfaces coated and the room temperature uniformly about 70° F.—A. J. Beecher.

Stains for Antique Finish

I do furniture refinishing and apply many antique or imitation antique finishes. Spirit stains are used for this work mostly, but these are not always satisfactory, as they penetrate too deeply in places; oil stains do not penetrate deeply enough. I would like to learn of a stain that could be used and regulated so as to get the desired effect on old wood.—W. A. H.

In reference to your staining trouble, I believe if you use one of the new permanent stains you will avoid this trouble, as evidently your spirit stains penetrate too deeply in places, while oil stains are hard to handle in refinishing jobs. After using varnish remover or any other chemical remover, I suggest you wash the wood surfaces with naphtha or a weak solution of washing soda before applying the stain. By using the soda solution, the wood grain will raise and as a result the surface will require considerable sanding to make it smooth. This method will remove all the old finish and you will have a clean surface to begin work on.—George Moskos.

In refinishing antiques the stain should be applied sparingly, as too much stain will hide the beauty of the wood. In my work, which is similar to W. A. H.'s, I prefer a stain soluble in alcohol. I cut this to get the proper tone for my work. If the stain is too dark,

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INSULATING MATERIALS

I wipe up the surplus as I apply the stain. In most mahogany refinish jobs, I color orange shellac to the shade of the mahogany I want, and thin it. When this is dry, I fill the surface with a filler colored to match the mahogany, after which I tone up with colored shellac and then finish. Most of the old mahogany, after it has been cleaned, has enough color so that very little staining is required.

I have also found that some of the new quick-drying stains are O. K. Of course, on imitation finishes, it depends on the nature of the wood. If a soft wood is being refinished, the stain is apt to be too deep in spots, and a thin coat of shellac will help in this event. But in any case, rather than have the stain too dark, it is best to apply it thin and then tone up to the desired shade.—J. K. Cooper.

What Tinting Colors Are Made Of

Nearly all whites have their base in the oxides and carbonates of different metals.

White lead is a carbonate of lead prepared from common lead. Zinc white is oxide of zinc, durable and beautiful. China white is lead that has been washed, freeing it from all impurities. Pearl white is used for the finer branches of painting; it is a subnitrate of bismuth. Kremitz white is a superior quality of lead prepared by washing. Venice white is a mixture of sulphate of barytes and lead.

Yellows have their base in iron, lead, quick silver and arsenic. The best chrome yellow is made from chromium and acetate or the nitrate of lead. Gamboge is the juice of various trees in Ceylon. Yellow ochre is an earth—the best comes from France. Stone ochre is an earth found in many parts of Europe. Naples yellow is an earth, but some of it is made from lead, alum, sal-ammonia and antimony. Tumer yellow is a muriate of lead.

Reds have their base in iron, mostly. Carmine is kaolin or china clay colored with cochineal; a common article is composed of alum and cream of tartar with cochineal. Vermilion is composed of sulphur and quick silver. Madder lake is a composition of alum and soda or a silicate of potash or kaolin colored with madder. Venetian red is an earth found in various parts of the world.

Blues: Copper is the base of most blues, although some are formed from iron and cobalt. Prussian blue is properly a ferrocyanuret of iron produced by various processes as a vehicle dried, or calcined blood, horns and hoofs are used. Ultramarine was formerly made from luzulite, a beautiful blue mineral. Some is made from carbonate of soda, sulphur and kaolin colored with cobalt.

Greens: All mineral greens have their base in copper and some of them contain arsenic. Brunswick or Bremen green is a compound of carbonate of copper and chalk and the best a portion of lead. Emerald green is a compound of yellow arsenic and verdigris. Chrome green is made from blue oxide of chromium and some is composed of potash, sulphur and chromic acid.

Browns generally depend upon iron for their grade of tints. Umber is an earth found in Turkey and the Island of Cypress. Both in the raw and burnt state, it is

2-hour RUBBING VARNISH

The sensational new product you've been waiting for—Has better body than lacquer . . . . 2 coats being equal to 3 coats of lacquer . . . . you can maintain same production schedule with it as with lacquer . . . . at 50% lower cost.

Spray one coat—follow in two hours with second—rub next morning.

Dries dust free in 10 to 15 minutes.

Its hardness is unusual considering its elasticity.

Positively will not print.

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one of the best browns we have. Terra De Sienna is an earth found in Italy. Raw and burnt umber are a rich transparent color. Mineral brown is made from sulphate of copper and prussiate of potash.

Blacks: Lamp black is merely the captured smoke or soot from various substances. The best is from coal tar; this is the best black for common painting. Ivory black is only charred bones. Either of the above may be washed or elutriated and then dried in drops to produce "drop black" which in its purest form is used for the finer painting.—J. K. Cooper.

Fire Extinguisher Safety

It is well to remember that the hand type fire extinguishers are designed and intended to be used only for emergency cases, such as when a fire first starts; after the fire has enveloped a whole room, these extinguishers are useless, and some more powerful means of combat is then necessary.

Always have the extinguishers placed so they can be seized at a moment's notice. Do not allow stacks of material in process, or supplies, or loaded trucks, or anything else to block the way to the extinguishers. When a fire starts the first few seconds count most for success in combating the spread of the flames.

Where fire extinguishers are hung on posts in a room, it is a good plan to paint a section of the post red on all four sides. This will mark that post as having a fire extinguisher on it, even though the extinguisher itself is not visible.—F. W. Purdon.

New Materials and Equipment

Presenting briefly, certain outstanding features of new materials and improved equipment which have been developed for use in modern industrial finishing departments

Portable Air Compressor

The Saylor-Beall Mfg. Co., Detroit, Mich, announces "a light portable air compressor for paint spraying, tire inflation and many other purposes where air is needed in small volume." The company declares that it "will give a two-year guarantee against defects in workmanship or material," but "this guarantee does not include motor and rubber tubing."

Also, by making a few alterations, the maximum pressure of air delivered by the Model 116-K can be increased to 120-lbs.

Specifications

Bore.....2-in., Stroke.....1¾-in.
Speed of Compressor.....600-r.p.m.
Capacity..1-½-cu.ft. free air per min.
Drive.....rubber belt, adjustable.
Bearings .....bronze.
Lubrication .....positive.
Motor.....¼-h.p. (60-cycle A.C.)
Finish.....red and black enamel.
Fittings.....cadmium plated.
Net Weight.....50-lbs.
Shipping Weight.....76-lbs.

"Thorough, efficient and simple design."

"Prismlac"—A Decorative Finish

A new and interesting decorative finish in a clear lacquer product has been introduced in "Prismlac" manufactured by Maas & Waldstein Co., Newark N. J. Its simplicity of handling by ordinary spray methods and the beautiful decorative effects obtained on smooth surfaces show promise of very wide application. Clear, colored or bronze finishes may be obtained. "Just Spray and Watch it Crystallize" is the description given by the manufacturer.

The fact that "Prismlac" *air dries* in about one hour gives it a decided merit and, according to the manufacturer, "in comparison with a three-coat crackle finish it shows a decided saving in material and labor as well as providing a novel finish."

In solid colors "Prismlac" has the merit of entirely obliterating, *in one spray coat*, such defects as drawing marks, spot weldings or file marks on stamped-steel parts. Clear "Prismlac" is used on innumerable polished metal articles and novelties to make them attractive.

Not any doubtful "secret process," - rather painstaking care on the part of experienced workmen in the manufacturing and judgment in the choice of raw materials, can only account for the HIGH QUALITY of

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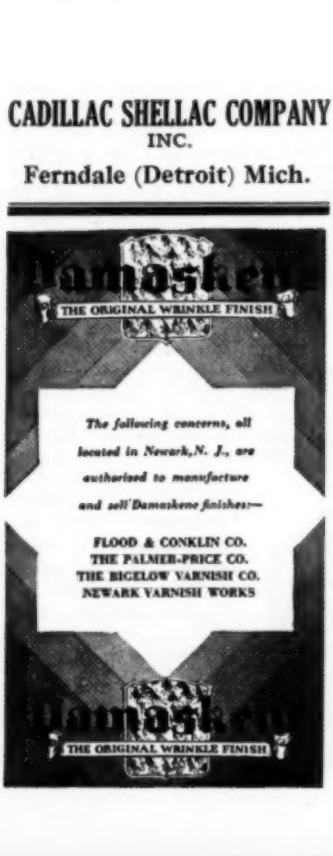
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THE BIGELOW VARNISH CO.
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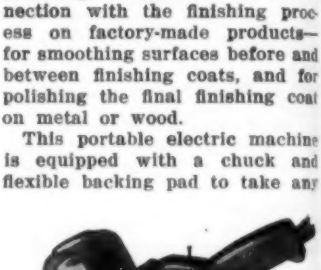
THE ORIGINAL WRINKLE FINISH

Portable Electric Sander and Polisher

The Nedco Co., Natick, Mass., announces an improved "Model H," heavy-duty sanding and polishing machine for use in connection with the finishing process on factory-made products—for smoothing surfaces before and between finishing coats, and for polishing the final finishing coat on metal or wood.

This portable electric machine is equipped with a chuck and flexible backing pad to take any



"Built for continuous service"

standard make of flat abrasive disc 9x9½-in. in diameter with 7/8-in. hole. It can also be equipped for rubbing and polishing. Oversize ballbearings throughout. Universal motor, ½-h.p., furnished for 32, 110, 220, 240 or 250-volts, 60-cycle or less, A.C. or D.C. No-load speed 2500-r.p.m., weight 13½-lbs., 20-ft. reinforced cord and attachment plug.

Attachments adaptable for use on this machine include: A 9¼-in. disc for sanding or grinding any flat or curved surface; a lamb's wool pad for final buffing of lacquer; an 8-in. felt pad for use with rubbing compound for polishing lacquer; a 6-in. rotary

wire brush and attachment; and a high-speed drill chuck for ¼-in. drill.

Color Analyzing Device Developed

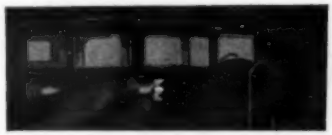
An automatic apparatus with which the colors of transparent and opaque objects can be analyzed with a scientific accuracy in less than ten seconds has been developed in the graduate laboratories of the University of Pennsylvania's Department of Physics.

The device was perfected by Joseph Razek and Peter J. Mulder, instructors in the Department of Physics, to whom the practicability of constructing such an apparatus suggested itself while they were engaged in a problem of pure research as candidates for the degree of doctor of philosophy.

The new "color analyzer" is portable and is built into a box about the size of a large suitcase. It can be operated either by connection to any electric light socket or from a suitable bank of batteries.

The sample to be tested is placed over a small rectangular opening on the top of the box where it is illuminated by a powerful source of light. The light reflected perpendicularly from the sample is admitted to a spectroscope in which it is separated into its component colors.

A selected portion of the dispersed light is then allowed to pass into a photoelectric cell, the very feeble current passed by this cell as a result of the light falling upon it being amplified about a million times. This is done by means of a special amplifier, known as a "bridge grid resistor amplifier" developed for the particular purpose.



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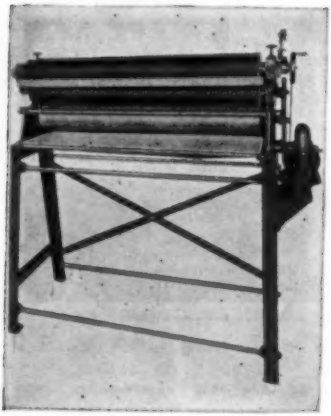

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The amplifier employs two vacuum tubes such as are used in the last stage of many radio sets, with certain adaptations which greatly increase their sensitivity, and the amplifier current is indicated on a sensitive galvonometer whose reading can be noted on a scale on the front of the machine and at the same time recorded on a photographic film.

By turning a small crank, different portions of the spectrum are successively admitted to the photoelectric cell until the entire spectrum has been covered, while the photographic film is moved through a corresponding distance. Co-ordinate lines and an identification number are printed on the film in a separate compartment of the machine.

The entire operation of analyzing a color is thus automatic and a complete record of a colored sample can be obtained in less than ten seconds.

The new machine has equal sensitivity throughout the entire visible spectrum and can be extended easily into the ultra-violet. Since the sample is illuminated obliquely and the light tested is reflected perpendicularly, the effect of any gloss on the surface of the sample is eliminated. By a slight modification of the illuminating unit, the machine can be used to measure the gloss of a surface.

Heretofore one of the most trying finishing-room problems has been to find efficient and convenient means for stirring full, or partially filled, barrels of pigmented finishing materials such as paints, enamels, undercoats and lacquers, but today several makes of agitators or stirrers are available for this purpose.

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We supply the finishing materials. You apply them.

Our job does not end with the shipment of the order. We follow our materials through YOUR plant to the time of shipment to YOUR customer.

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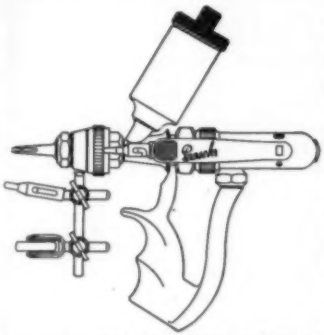
Universal Production Striper

In announcing the latest addition to its line of finishing equipment the Paasche Airbrush Co.,



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Although developed particularly for automotive production, these precision stripers are readily adaptable for use on other articles, as well as for striping in the painting and decorating trade.

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Smooth flowing, quick drying Amerilac Lacquers, developed through close association with furniture manufacturers, and an intimate knowledge of their requirements, stand the test in high-grade finishing.

Pleasing effects are obtainable with either Amerilac No. 96 Gloss or the No. 97 Rubbed Effect Lacquers.

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The American Varnish Co.

High Grade Varnishes, Pyroxylin Finishes, Stains, Fillers and Enamels

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Colors for Glazing

An interesting decorative effect particularly applicable to many painted articles is known as "antique shading"—variously called glazing, misting, smoking or parchment finishing. To do this work properly calls for skillful manipulation of the spray gun. The purpose of the glazing is to impart welcome variety to a plain body color or subdue the sharpness of a bright one, at the same time producing that aged or antique appearance which has been in such demand during recent years. All colors cannot be used in glazing, as some are opaque and some are transparent. Some colors are too costly to use on large articles.

Yellows

Raw sienna is generally used; it is quite transparent and makes light and dark buff parchment shades and old ivory; when used over blue, it gives the blue a greenish cast.

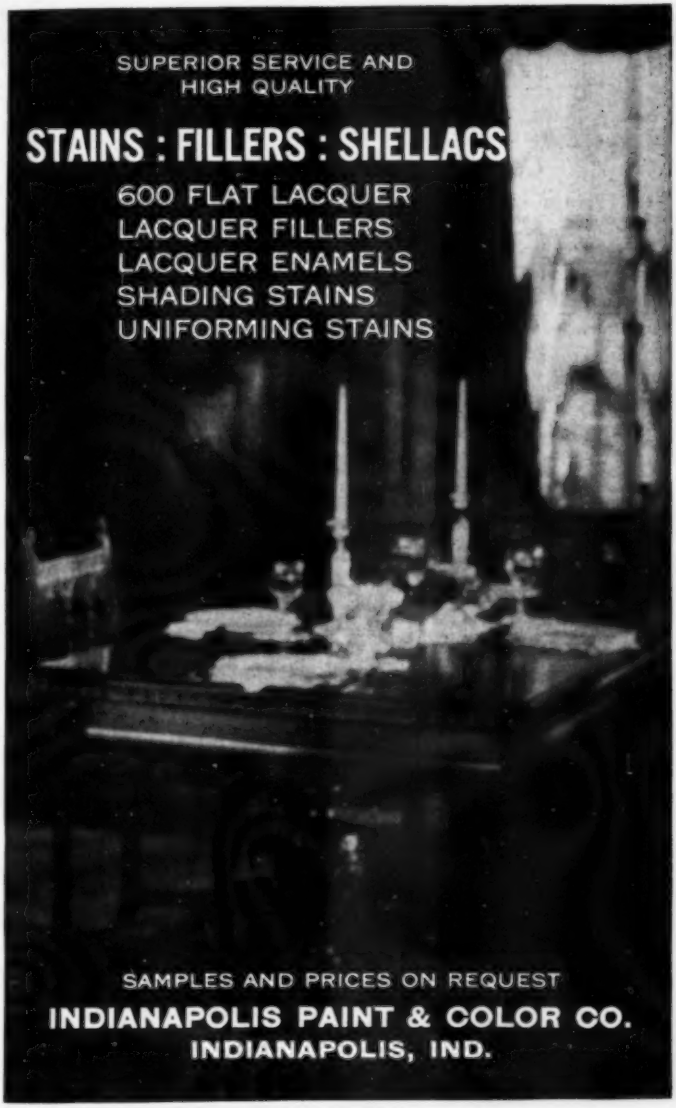
Chrome yellow is opaque and not used much in glazing except on small decorations; then it must be mixed very thin and well wiped out.

Italian pink produces yellow tints. It's more transparent than raw sienna, but the price of the material prohibits its use on a large surface.

Gamboge: The hue of this pigment is nearly that of chrome yellow; it is transparent, but not fast to light and not used much except on small surfaces.

Golden ocher: There are many mixtures of ocher; some are transparent while others lack transparency; raw sienna takes its place.

Cadmium yellow: This is a bit redder than medium chrome yel-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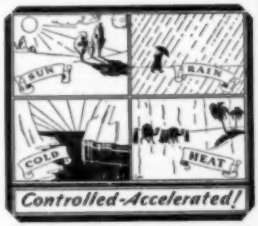

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low. The color is very strong and is only used on furniture and decorated surfaces. This is a costly color and more transparent than chrome yellow.

Yellow lake: This is a light yellow color which shades from a light yellow to an orange hue; it fades easily unless made from a coal-tar yellow.

Indian yellow: not used much except by artists on small surfaces.

Dutch pink: This is an olive yellow and not used much, although it is an excellent color and very transparent.

Zinc yellow: A bright greenish hue, not used much except by artists. It's more expensive than lead yellow, more transparent and better for glazing.

Greens

Light medium dark chrome greens are the most important; used thin, they are transparent enough for a glaze. Many excellent olive shades can be made with the addition of raw sienna and, in some, a little touch of raw umber.

Verdigris green: This green has a bluish hue; it is often used over bronze to give an antique copper finish. It is not suitable for large surfaces as it fades easily in a strong light.

Emerald green: A bright bluish green not much used in glazing.

Green lake is used only on small surfaces.

Emerande green: A light bright green, but too costly for use in glazing.

Alizarin green: This is a very transparent green and very expensive.

Malachite green: A dark yellowish green of very little use for glazing.

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Perfectly balanced, non-tiring, strong, serviceable AND light in weight, (2 lbs.).

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Burnt umber is a reddish brown hue, depending on amount of pigment added to the glazing liquid.

Raw umber is a greenish cast in dark shade and makes a soft gray in the lighter tint.

Van Dyke brown is a rich deeper brown than burnt umber; made in a thin form, it produces warm brown and grayish tints.

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Burnt sienna: This is a permanent color, reasonable in price and very transparent so it can be used any place. The best grade is brighter and more transparent.

Vermilion is not used much as a glazing color, as it's too opaque for general use, but owing to its brightness it is sometimes used on small areas.

Carmine: Very expensive and only used by artists on small work.

Alizarin lake: A very transparent color used only by artists on very small work.

Rose lake: A very transparent color and used mostly on small work.

Rose pink: About the same as rose lake.

Crimson lake: A red with a bluish hue, very transparent and too costly for most work.

Scarlet: A bright red, transparent, and too costly for glazing purposes.

Magenta mauve: A very rich color of a bluish cast, transparent and very costly.

Blues

Prussian blue: The most valuable of the blues for glazing work; has great strength and is not too expensive for any kind of work.

Antwerp blue: Used only by artists on small work.

French Blue: A fine grade of

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A rapid drying FILLER*

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. . . also adapted for use under the old finishing routine of shellac and varnish, or for straight varnish finishing, drying much faster than the old long oil fillers.

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mechanically amplify the cut-lift-stir movements a veteran painter makes with his stirring stick in a pot of paint. Not mere round-and-round stirring.

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This portable paint spray unit should not be confused with toy outfits that operate by the blower on fan principle. Its air compressor has metal pistons and rings and gives a steady air pressure so necessary to thoroughly atomize paint materials, and produce smooth, long lasting finishes. Ready to attach to convenient light socket—price $59.50.

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Motor and air compressor directly connected (no belts or gears), compactly mounted. An ideal unit for touching up fenders, car and truck bodies, painting walls, furniture, etc.

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ultramarine blue used in making clear purples.

Ultramarine blue: A very fine blue for glazing, a rich hue of good transparency, although not as strong as Prussian; has reddish hue when mixed with white, very fast in light and moderately priced.

New blue: Cobalt blue of a cheaper grade and not much used.

Cobalt blue: Lighter shade than ultramarine and more expensive.

Cerulean blue: A lighter blue than ultramarine; the cheaper grades are apt to be gritty and of very little value for glazing.—J. K. Cooper.

Keep Tab on Brushes

In most large finishing departments, foremen have to contend with the "mystery" of disappearing brushes; no one knows where they have gone. It is a good plan to furnish each man, who uses brushes, with the necessary brushes for his work; also a place for him to put them under lock and key each night. Then hold him responsible for his brushes, not furnishing a new brush to a man unless the old brush is turned in. In case the brush has disappeared, he is responsible and should be charged for it. Loss of brushes from stealing, in the large factories, runs into quite an item of expense.

Millions of American families that have already absorbed motor cars and other modern inventions into their standards of living will want to incorporate better housing and furnishing standards into their scale of living during the next few years. This advance is not confined to the upper income groups, according to Dr. Julius Klein, Assistant Sec. of the Department of Commerce in a recent speech.

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EDITORIAL

Pay Your Foreman to Reduce Operating Costs

Today the operating costs of a finishing department furnishes a problem for the foreman finisher to study and solve to the best of his ability. With the keen competition now prevailing in business, finishing costs must be given considerable amount of attention constantly.

It is extremely difficult to create any large saving in a finishing department by making radical changes, but a reduction of operating cost, carried on intelligently—that is without sacrificing quality—should always stand foremost in the mind of the finishing foreman.

For a foreman to operate a finishing department intelligently as to cost, he must first know the amount he is spending for labor and material weekly, monthly and yearly. Each week he should have prepared for him, an itemized statement of the expenditures for all material and labor. When these figures are placed in the finisher's hands, he can usually discover, after careful study, where there is a possibility to create a saving.

It is unfair to ask a man in charge of a department to operate it intelligently as to cost, if he is forced to do so in the dark, on account of the lack of figures. Like a credit account in a store, it is only when one receives his weekly or monthly bill that he realizes what has been spent. It is easy to write requisitions, easy to forget the quantity of material issued and difficult to know if the material one has received has produced the required amount of work—if no comparative figures are available to be used as a guide.

It must be admitted that there is a big possibility for waste in finishing materials, and if the foreman shows through his watchfulness of this matter, that he has placed a considerable saving into the general funds—don't forget, he too uses money to live with.

Keynote to Future Designs in Exhibits Now Presented

At the Second International Antiques Exposition, held recently in New York City, one of the most prominent and possibly the most interesting of the 200 exhibits was a Tudor oak paneled room from Billingbear House, England, originally built in 1480 and restored in 1567. The parts were numbered and set up for the exhibit. This exhibit included paneling exquisitely carved, a number of heavy

beams and timbers pinned together with hardwood pegs, and considerable hand wrought metalwork and iron fireplace equipment.

Another exhibit consisted of an 18th century pine-paneled room and part of an old Adam pine room with pewter mountings. The outside of this booth was in oak paneling from a fine James I room of about the time of 1660. One booth was fitted up as an antique chestnut room and furnished with articles of the 18th century.

Much of the American antique furniture exhibited was made of pine, maple and cherry. Old black walnut, mahogany and satinwood were well represented in the old furniture of both America and England.

A most valuable lesson emphasized strongly by the different exhibitors, who strove for an artistic effect in their displays, is that there is no beauty in overcrowding. All the booths that were really well arranged, whether large or small, showed no overcrowding. The arrangement and setting of rare old furniture was in harmonious surroundings, and it showed up attractively.

The exposition was such a decided success that plans have been made for the 1931 exhibition to be on a much larger scale, occupying three instead of two of the immense floors of the Grand Central Palace.

Nitrocellulose Products Pushed

In recent years there has been a tremendous growth in the use of lacquer. New uses for lacquer and new applications for known uses are constantly being developed, as often by ingenious industrialists

The Pulmosan Safety Equipment Corp.

Wishes to Announce that they have Purchased Patent No. 1,710,160 Covering All Respirators with Non-Inflated Cushions

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Water Stain—

requires ***no sanding . . . . . no wash coat*** . . . . saves 24 hours in the finishing room. One furniture manufacturer saves $1.50 on every dining room suite.

Positively fast to light . . . . made only from water aniline colors. Inquiries solicited. We will be pleased to demonstrate this product or send samples for you to try . . . . Our service department is at your disposal.

Finishing Products Co.
3725 E. 13th St. Indianapolis, Ind.

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KUTTROFF, PICKHARDT & CO., Inc.

1150 Broadway, New York, N. Y

searching for ways to improve their products and reduce expenses as by those who are trying to increase the sale of lacquers.

Although the growth of the automobile industry has contributed to the increased use of lacquer, this has not been the governing factor in the growth of lacquer consumption. A large field outside the automobile industry awaits further development, and the purpose of one large company's extensive advertising campaign this year will be to cooperate with manufacturers of nitrocellulose products in the development of this field.

While this company does not manufacture the finished materials, as a large producer of the nitrocellulose ingredient of lacquers, celluloids, and solutions, it is interested in seeing new uses for them developed. The advertising appeal will be directed toward business leaders who may profit by adapting these versatile products to their businesses.

Teach Practical Finishing in Schools

The State of Wisconsin recently sent out a questionnaire which may be of interest to those who have given thought to our previous suggestions and comments upon the need of apprenticeship in the finishing trades of industry.

Questions were sent to those who had begun apprenticeship training prior to 1923, and the following interesting facts were developed:

Those who completed their training are at present earning 40% more than those who started and dropped out.

Of those who dropped out 65% admitted that they could have

earned much more had they completed their training, and 62% stated that if they had it to do over again, they would complete their course.

At the time of this questionnaire, one percent were unemployed among those who completed their course, while 9% of those who dropped their courses were unemployed.

There can be no question but what apprenticeship has proved beneficial to both employer and employe in other trades, and it is to be hoped that the present movement on foot in various parts of the country to develop an apprenticeship system in industrial finishing will gain widespread support. Concerted action in the more populous sections, with night schools fostered by a number of industries in each section. would be of inestimable help.

Mixing Graining Colors

In graining, to imitate the various kinds of wood the artisan frequently uses vinegar as a vehicle for mixing graining colors. Discolorations of the finishing varnishes will take place on account of the reaction of vinegar or acetic acid on oils and varnishes. Acetic acid has always been known as a softener of and a bleaching agent for such coatings, therefore, practical experience proves the fallacy of this theory and vinegar should be entirely eliminated for graining.—Geo. Whigelt.

With so much engineering and technical service available, there is no excuse for permitting old methods and obsolete equipment to stand in the way of profitable manufacturing.

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John R. Dudley, manufacturer of the famous Pava Pottery using the SPRA-MORE in his plant at Los Angeles, Calif.

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John R. Dudley

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First-class paint and lacquer superintendent. Must be able to formulate all kinds of Industrial Paints and Lacquers. State salary. Address IF-322, care Industrial Finishing.

METAL FINISHING SUPERINTENDENT

Desires position. Twelve years' experience as foreman, superintendent and field inspector. Experience automobiles, fireproof doors, elevators, metal partitions and metal furniture. As superintendent had charge 175 men. Address IF-323, care Industrial Finishing.

FACTORY MANAGER WANTED

Established lacquer company wants man competent to manage factory producing full line of clear and pigmented lacquers. Must be well grounded in lacquer chemistry, preferably with degree in chemistry from school of recognized standing. Must have experience either laboratory or plant in lacquer industry. Location New York metropolitan district. Applications treated confidentially Address IF-324, care Industrial Finishing.

We have openings listed for men with experience as follows:

Supt.—lacquer plant
Supt.—varnish plant
Chemists—paint and varnish research

TECHNICAL SERVICE AGENCY INC.
217 Broadway
New York, N. Y.

FOR SALE

One spraying outfit as follows:

1 type M-1249 steel fumexer 8' wide, 6½' high, 5' deep with metal floor and back for two fans. 1 LD portable reflector. 1 double hook.

2 DJ electric exhaust fans No. 9112, 9993, with 110 volt AC, 60 cycle single phase motor with blades and rings. 1 FE floor type turntable 36" square top 12" high.

With stationary electric heater valves, agitators, etc. being a complete spraying outfit, as bought from the DeVilbiss Manufacturing Company of Toledo, Ohio, in used condition, but practically good as new.

AUGUSTA LUMBER COMPANY, Augusta, Ga.

SALESMEN

This is an appeal to a real business getter, now employed, and not looking for a job, but who, for some reason, has been prompted to read this ad—a salesman, in the wood and metal finishing industrial field, with a highly successful record, and a loyal and established clientele.

We want a man who has made money—a man who will not ask for more than he can give.

We are a nationally known manufacturer of finishing materials, for the wood and metal trades, with plants in the East and Middle West.

Our complete line of lacquers, stains, fillers, spirit varnishes, shellac, etc., are of the highest type.

If you want to make a change and your territory is any part of the Middle Western or Northern States, New York, Pennsylvania, Middle Atlantic States, or South Eastern States, write us in confidence, giving your complete history.

Tell us what you have to offer, and what you want, in return for your ability to produce.

A personal interview will be arranged.

Our salesmen have been advised of this ad. We are not replacing any men, but adding to our sales personnel, and readjusting the territories accordingly.

Address IF-325, care Industrial Finishing.

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Electric

Wide Open All Day Long

That's the test we welcome on these HB Portable Paint Spray Compressors—because it will positively keep one large size spray gun wide open in continuous use.

30 DAYS' TRIAL
—at Our Risk to Prove It.

HB Portable Paint Spray Outfits

Priced far below anything of similar usefulness and capacity on the market.

Twin cylinders insure ample capacity. Single unit, beltless, ball bearing, construction saves 10% to 20% on electric bills.

Investigate these HB units now for maintenance painting, small production work or small units.

Mail Coupon below for details

Stationary

Electric

HOBART BROTHERS
Box F40
Troy, Ohio.

Mail Coupon Today

HOBART BROS.
Box F40
Troy, Ohio

Without obligation send me complete details on the HB Paint Spray compressors, also details of HB Trial Plan and Easy Terms.

Name_____

Address_____

Paasche Airrubbing Equipment finishing radio cabinets in a large plant.

AIRRUBBING FACTS

Report from a Leading Manufacturer

*Annual Saving $13,404.56

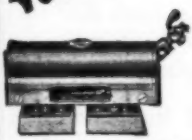
Increased Production 500%

Paasche Equipment Paid for Itself in Less Than 4 Days

THE above summary is characteristic of the savings made by Paasche Airfinishing Equipment, over methods formerly used. In this case* the Paasche small airrubbing machine was bought for rubbing panels 4' x 6', bringing an annual return of 8,377% on the investment.

The secret of Paasche performance lies in exclusive patented features. Paasche airrubbing machines are designed for the most delicate control, so that the finest finishes are produced rapidly and economically.

Send for bulletins on Paasche Airfinishing equipment, which may enable you to make a splendid showing on cost reduction in your plant. Our service engineers are glad to help solve finishing problems, without obligation to you.



The Paasche airrubbing machine gives 1600 hand strokes per minute. It produces a smoother finish, faster work, more uniform results than other methods. It will cut sanding and rubbing costs. Send for special bulletin.

Paasche Convertible multiplehead airbrushes cover the widest range of airfinishing work with standard equipment, adaptable to any coating requirements.

Paasche Airbrush Co.

1921 Diversey Parkway, Chicago, Ill.

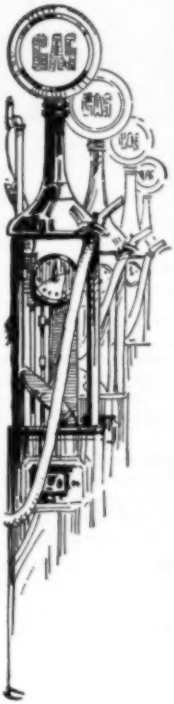
New York	Cleveland	Denver
Boston	Detroit	Minneapolis
Philadelphia	St. Louis	Seattle
Pittsburgh	Kansas City, Mo.	Los Angeles

A. R. Williams Machinery Co., Toronto

LET FACTS AND FIGURES SHOW ADVANTAGES

IFS Gray

Color
Marks The Gasoline Highway



Red — Yellow — Blue — Orange Brilliantly colored pumps catch the motorist's eye and direct him to his favorite gasoline.

Hilo Finishes—Lacquer and Air-Drying and Baking Enamels serve a two-fold purpose on these colorful sentinels of the highway:-

Brilliant color "Trade Marks" the pumps of each gasoline producer; the hard durable finish protects the pumps against severe outdoor weather.

Gasoline Pumps are but one of thousands of products upon which Hilo Finishes do double duty.

If the finish on your product is not just right; if costs run a bit too high or production in your finishing room is not up to par —

Consult Hilo

HILO VARNISH CORPORATION

1 GERRY STREET BROOKLYN, N. Y.

PHILADELPHIA BOSTON HILO CHICAGO PITTSBURGH

Air Drying { Clear and Transparent Color Varnishes Enamels — All Colors, White and Black } *Baking*

Lacquer-Clear All Colors, White and Black, Japans-Black and Rubber Finishes

Integrity Paint Co., New Haven, Conn. Paint Division of Hilo